



Installation, Operation and Servicing Manual Version 2.0.0



Models:

1350SLBFSAD | 2500HBFSAD | 3500VBFSAD | 6000VBFSAD | 10000VBFSAD | 15000VBFSAD

**TUFFA**  
**ADBLUE®**  
**STATIONS**





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## 1. Introduction

This manual contains specific instructions and information relating to the installation, operation and maintenance of Tuffa Tanks systems.

## 2. Conditions of use

- Read this manual before installing this system.
- Tuffa Tanks accepts no liability for personal injury or property damage resulting from working on or adjusting the equipment incorrectly or without authorisation.
- Tuffa Tanks accepts no liability for direct, indirect, incidental, special, or consequential damages resulting from failure to follow any warnings, instructions, and procedures set out in this manual.
- Tuffa Tanks reserves the right to change the specifications of its products or the information in this manual without necessarily notifying its users.
- Variations in installation and operating conditions may affect the Tuffa Tank systems performance. Tuffa Tanks makes no representations or warranties concerning the performance of the tank system under the operating conditions prevailing at the installation.
- Only parts supplied by or approved by Tuffa Tanks must be used and no unauthorised modifications to the hardware or software should be made. The use of non-approved parts or modifications will void all warranties and approvals and could lead to hazardous safety conditions.
- Unless otherwise noted, references to brand names, product names, or trademarks constitute the intellectual property of the owner thereof.

## 3. Safety

**PLEASE READ THIS MANUAL CAREFULLY BEFORE USE & COMPLY WITH ALL INSTRUCTIONS BELOW.**

**THIS MANUAL SHOULD BE KEPT WITH THE EQUIPMENT AT ALL TIMES.**

1. The major hazard involved with installing and operating the unit is electrical shock. This hazard can be avoided if you adhere to the procedures in this manual and exercise all due care.
2. Installation and use of this product should only be carried out by properly trained and approved personnel.
3. Please refer to storage media MSDS which should be supplied by the proprietor of this system which will detail the PPE required for handling and emergency procedures.
4. The user of this product is responsible for the safe and correct use of this product.
5. This product is only suitable for storage and/or dispensing of the liquid media referenced at the point of sale.



## 4. Product description

Tuffa AdBlue® Stations are designed solely for storage and dispensing of AdBlue®. The static bunded systems enable safe AdBlue® storage and dispensing in an outdoor environment. The high standard of specification ensures optimum safety and functionality. This product's standard specification is not approved for the resale of AdBlue®.

### 4.1 Product identification

The identification plate is located within the cabinet of each system and will detail the capacity, serial number, model number and year of manufacture.

Technical Details	
Model	
Capacity	
Date of manufacture	
Serial number	
Stored product	
Weight	
Material	LLDPE
Minimum wall thickness	5.4 mm
Bunded	Yes   No
Quality check	

If a spill occurs:

- Observe safety precautions (e.g. no smoking)
- Stop the liquid from entering drains or

If a spill occurs:

- Observe safety precautions (e.g. no smoking)
- Stop the liquid from entering drains or watercourses by containing it with sand or earth
- Do not spread the liquid by hosing it down. Do not add detergents.
- Call the Environment Agency (24 hours)

**EMERGENCY HOTLINE**  
**0800 80 70 60**

SCAN FOR USER MANUAL

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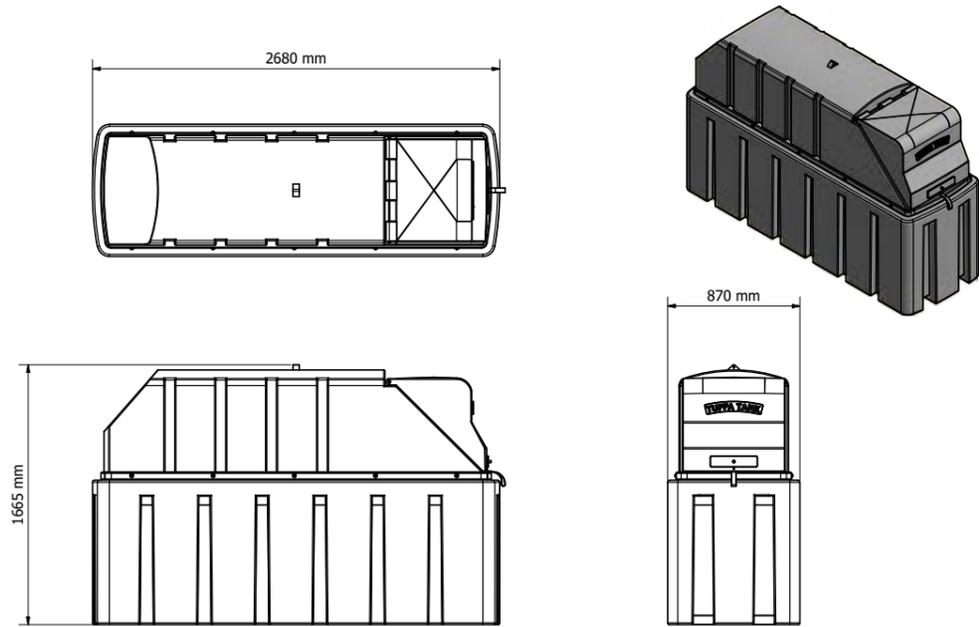
### 4.2 Product specification

	1350SLBFS AdBlue®	2500HBFS AdBlue®	3500VBFS AdBlue®	6000VBFS AdBlue®	10000VBFS AdBlue®	15000VBFS AdBlue®
<b>Capacity</b>	1350 litres	2500 litres	3500 litres	6000 litres	10000 litres	15000 litres
<b>Length</b>	2680mm	2840mm	-	-	-	-
<b>Width</b>	870mm	1520mm	-	-	-	-
<b>Diameter</b>	-	-	2013mm	2550mm	2890mm	2890mm
<b>Height</b>	1665mm	1630mm	2520mm	2585mm	2590mm	3500mm
<b>Cabinet depth</b>	-	-	600mm	600mm	600mm	600mm
<b>Weight (approx.)</b>	190kgs	280kgs	350kgs	430kgs	500kgs	700kgs
<b>Bund material</b>	Lower Linear Density Polyethylene					
<b>Inner tank material</b>	Lower Linear Density Polyethylene					
<b>Description</b>	Bunded AdBlue® Fuel Station					
<b>Fill point</b>	2" stainless steel dry break coupling					
<b>Ventilation</b>	1x 3" screened vent					
<b>Flow rate</b>	40 lpm (approximately)					
<b>Flowmeter</b>	Digital battery operated turbine meter (accuracy +/- 1%)					
<b>Delivery hose</b>	6 metres					
<b>Hose reel (optional)</b>	N/A		Hose reel available 8 metres - 19mm bore			
<b>Nozzle</b>	Automatic shut off nozzle					
<b>Gauge</b>	Clock gauge		FMS gauge and bund alarm (230V)			

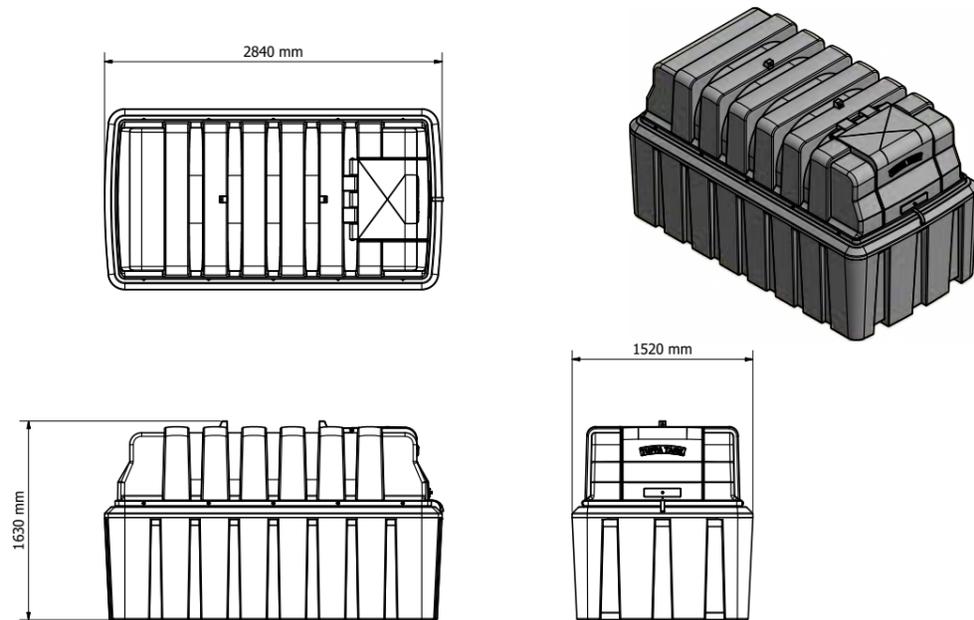


4.3 Product dimensions

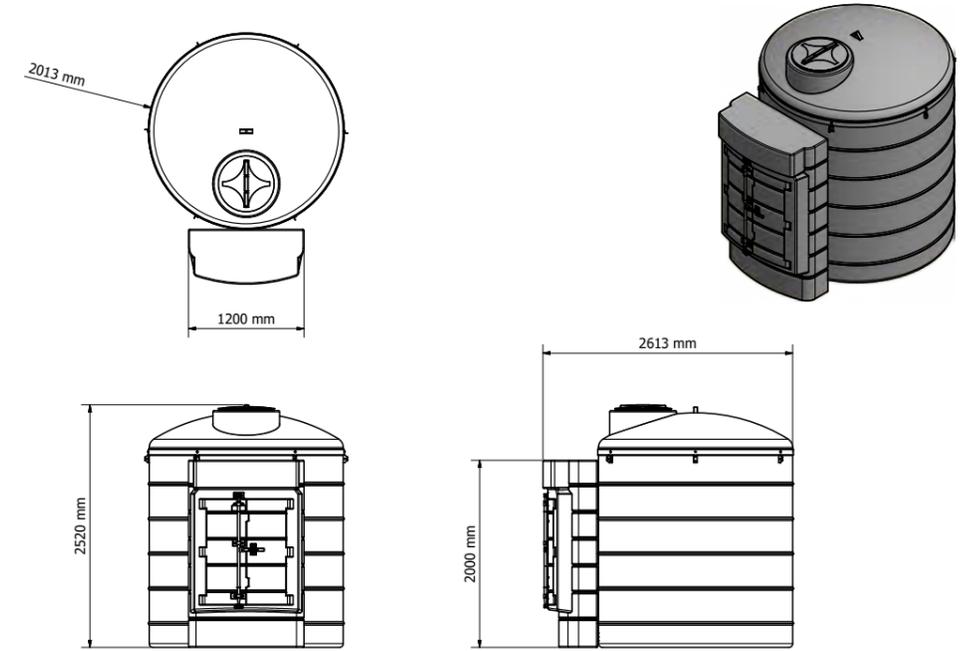
1350SLBFS AdBlue®



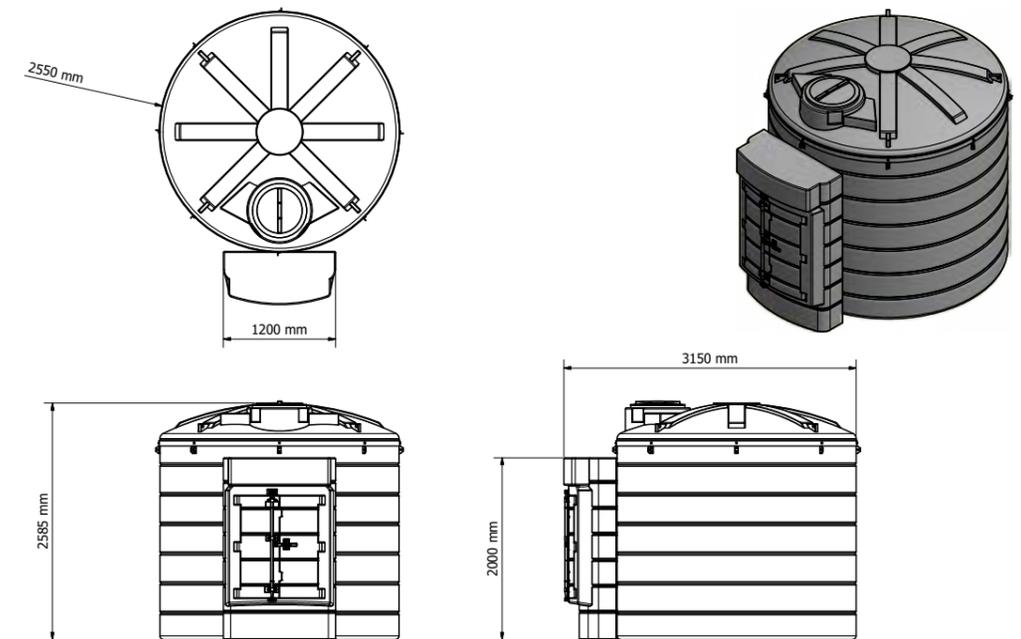
2500HBFS AdBlue®



3500VBFS AdBlue®

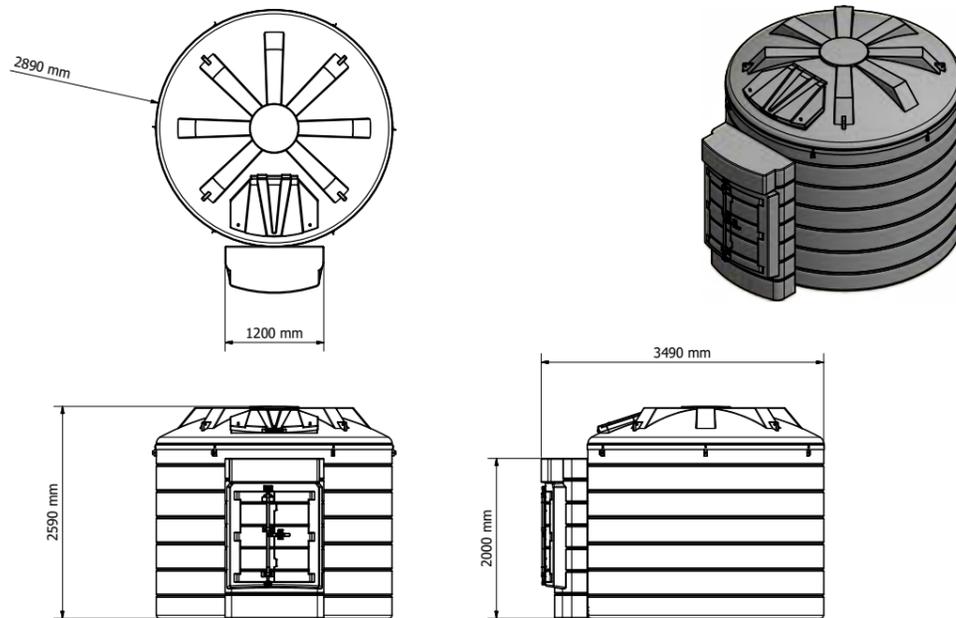


6000VBFS AdBlue®

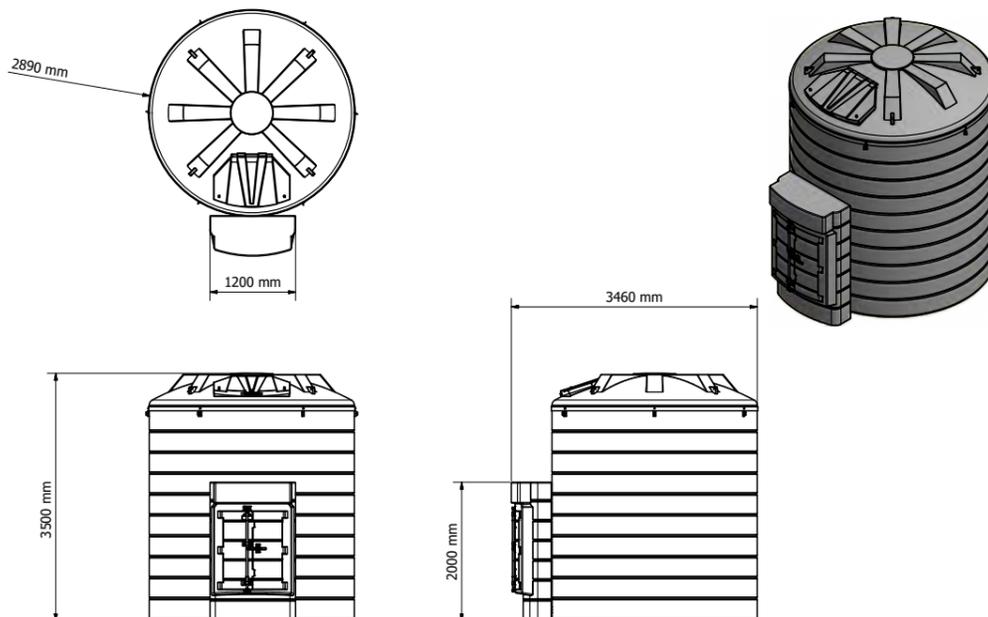




10000VBFS AdBlue®



15000VBFS AdBlue®



## 5. Transport & storage

### DO NOT TRANSPORT WITH LIQUID INSIDE THE TANK

1. During transportation the flip lid and cabinet doors are secured by 1 x R clip. The R clip must be installed prior to transportation.
2. Loading and off-loading must be carried out by a competent person using suitable rated and maintained equipment, either a forklift with extended forks/tines or a crane. If lifting slings are used, they must be attached to the lifting points as shown in the pictures below using a steel lifting eye insert. If lifting from below use a suitable rated forklift with extended forks. If lifting from above use a suitable rating lifting slings / chains.
3. 1350SLBFSAD / 2500HBFSAD - Lift with main lifting eye highlighted in red in the image below or forklift from the side.



4. 3500VBFSAD / 6000VBFSAD / 10000VBFSAD / 15000VBFSAD - Lift with x4 equal spaced lifting brackets as highlighted in red in the image below or forklift from one side using a ratchet strap to secure the tank to the forklift mast.



5. Tuffa AdBlue® Stations must never be pushed or rolled.
6. During transport and storage, the flip lid or cabinet doors must be closed and secured.
7. Loading, transport and storage areas must be smooth and free of sharp edges.



## 6. Installation & commissioning

### 6.1 Installation guidelines

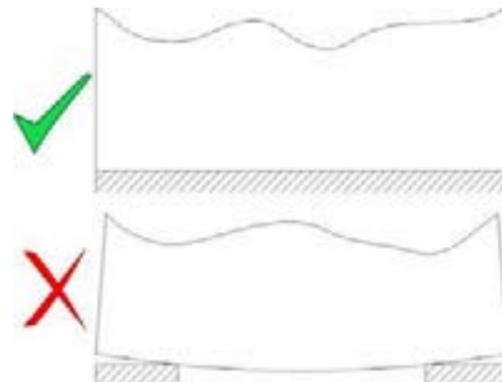
The proprietor of the Tuffa AdBlue® Station is responsible for complying with all legal requirements relating to the installation and use of this product, as well as the guidelines issued by local firefighting authorities and environmental authorities.

Once the Tuffa AdBlue® Station has been received on site, check that no damage has occurred while in transit. Locate the tank in the desired location using either crane, forklift or rollers.

### 6.2 System installation

#### System foundation

The system must be installed and fully supported on a smooth levelled concrete base built in accordance with good building standards and engineering principles. It is recommended that tanks be installed on a concrete base at least 100mm thick. Please refer to diagram below:



### 6.3 System location

The location of the system should be positioned by a road or passing with sufficient width, and loading capacity to accommodate a tanker delivering AdBlue®. Provision for the U-turn of a tanker should be considered. Potential obstacles in the form of tree branches, high voltage lines, or parked vehicles must be minimized.

The space around the system should allow free and collision-free movement of served vehicles.

Provision should be made to protect tank from impact damage.



### 6.4 Electrical requirements

Only a suitably qualified electrician according to applicable regulations may work on the electric wiring installation. The system components under service, maintenance, and repair work must be disconnected from the power supply before any work is undertaken.

#### System power requirements:

##### 230V

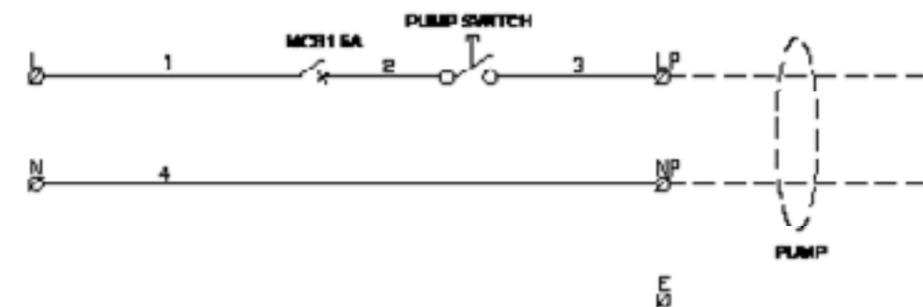
- 220 - 240 Volts, 50 Hz +/- 10%
- 20 amp circuit breaker recommended
- Power cable recommendation: 3 Core 2.5mm flex cable
- Duty cycle: 20 minutes
- **CAUTION: DO NOT RUN PUMP MOTOR WITH A CLOSED NOZZLE FOR MORE THAN 2 MINUTES**

##### 12V/24V

- Cable clips come pre-wired
- Duty cycle: 20 minutes
- **CAUTION: DO NOT RUN PUMP MOTOR WITH A CLOSED NOZZLE FOR MORE THAN 2 MINUTES**

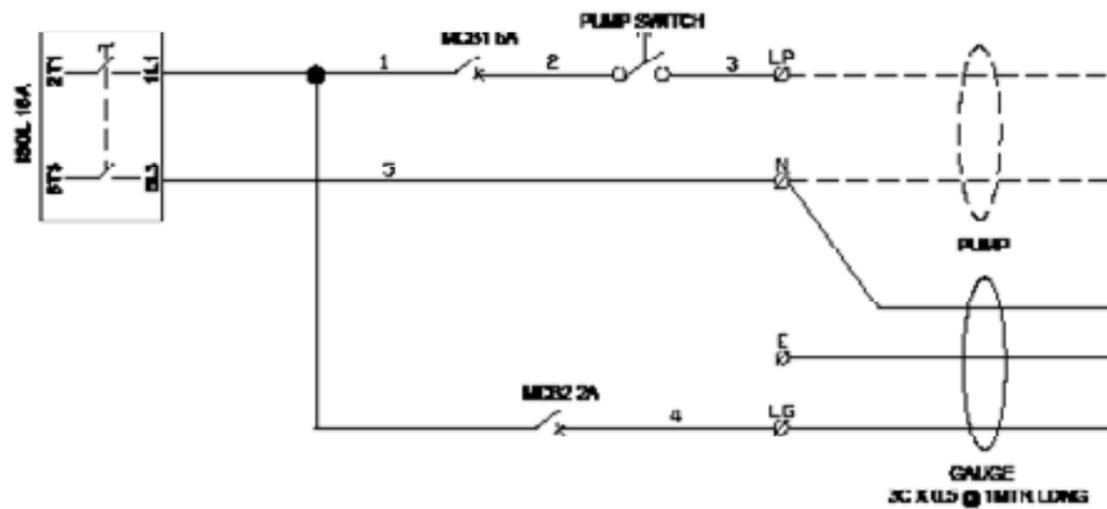
### 6.5 Electrical wiring diagram (230V)

#### 6.5.1 1350SLBFS AdBlue® / 2500HBFS AdBlue® – Key Switch





6.5.2 3500VBFS AdBlue® / 6000VBFS AdBlue® / 10000VBFS AdBlue® / 15000VBFS AdBlue® – Key Switch



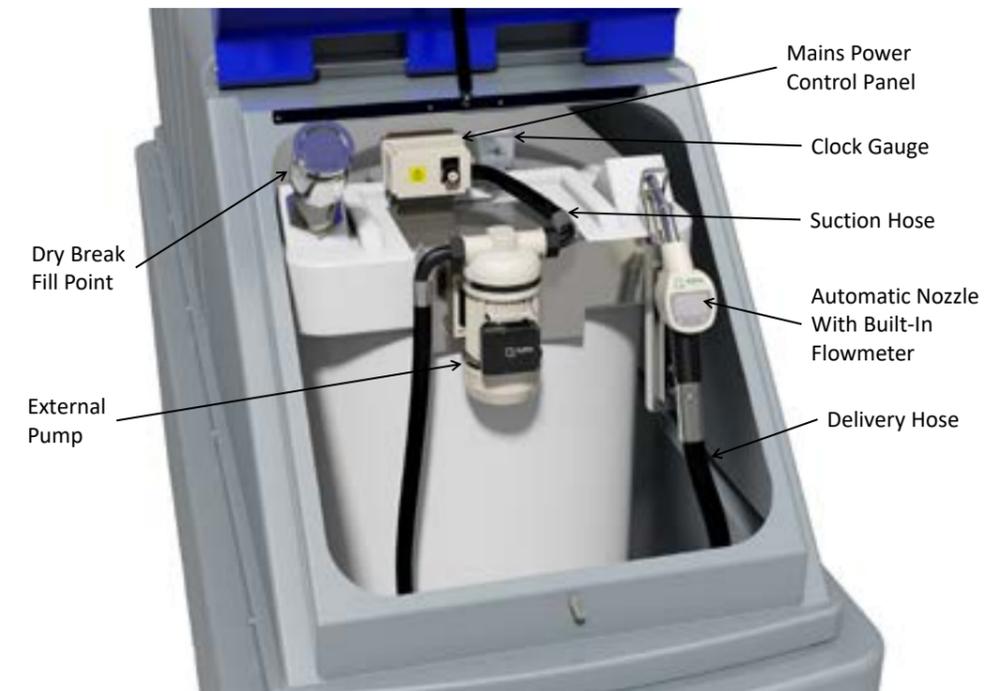
## 7. Operation of the system

The system and its components are intended for AdBlue® only and for the purposes described below. Use of this system in a means other than described below is regarded as mis-use of the system, the user of the system will be liable for any defects that occur due to its unintended use.

### 7.1 Using the system

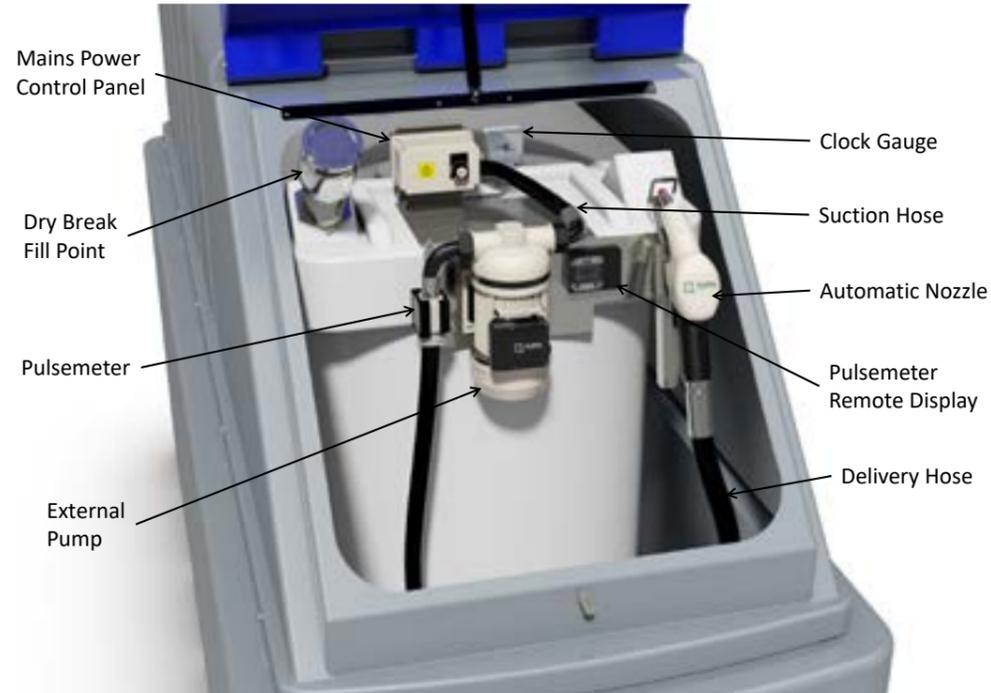
The operation and maintenance personnel must be suitably trained to use the system, the user must make sure they fully understand the operation and maintenance sections of this manual.

### 7.2 Summary of main parts 1350 / 2500 (230V)

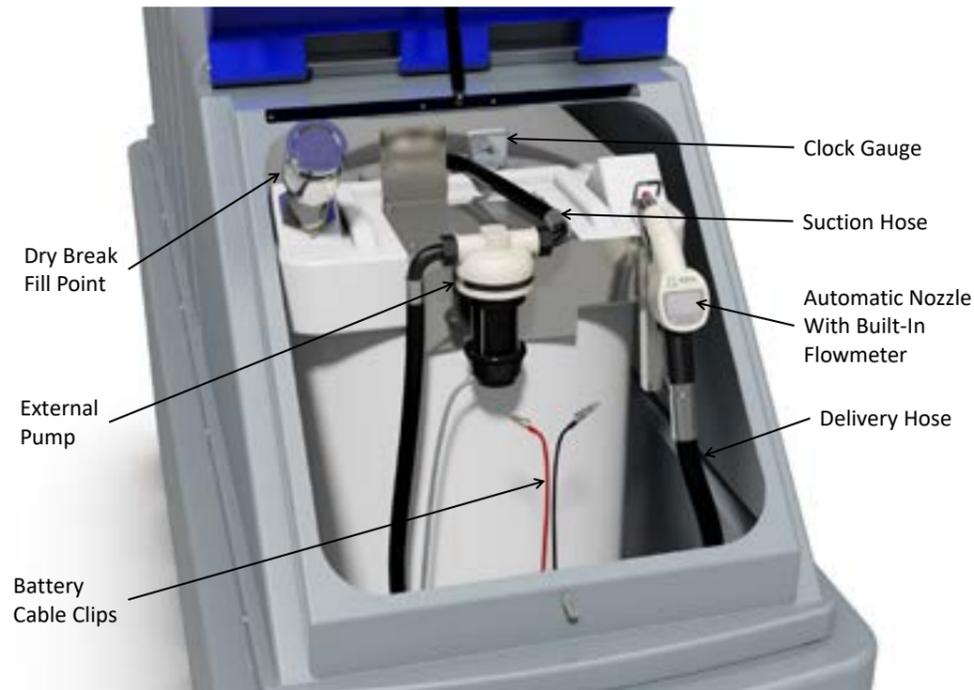




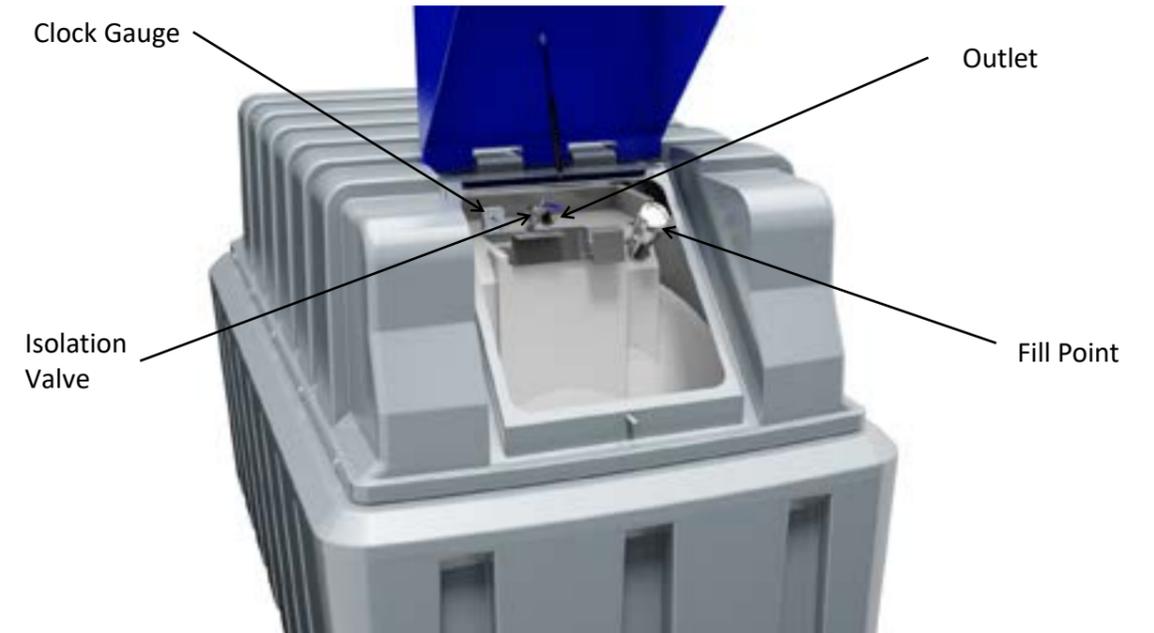
(230V, pulsemeter)



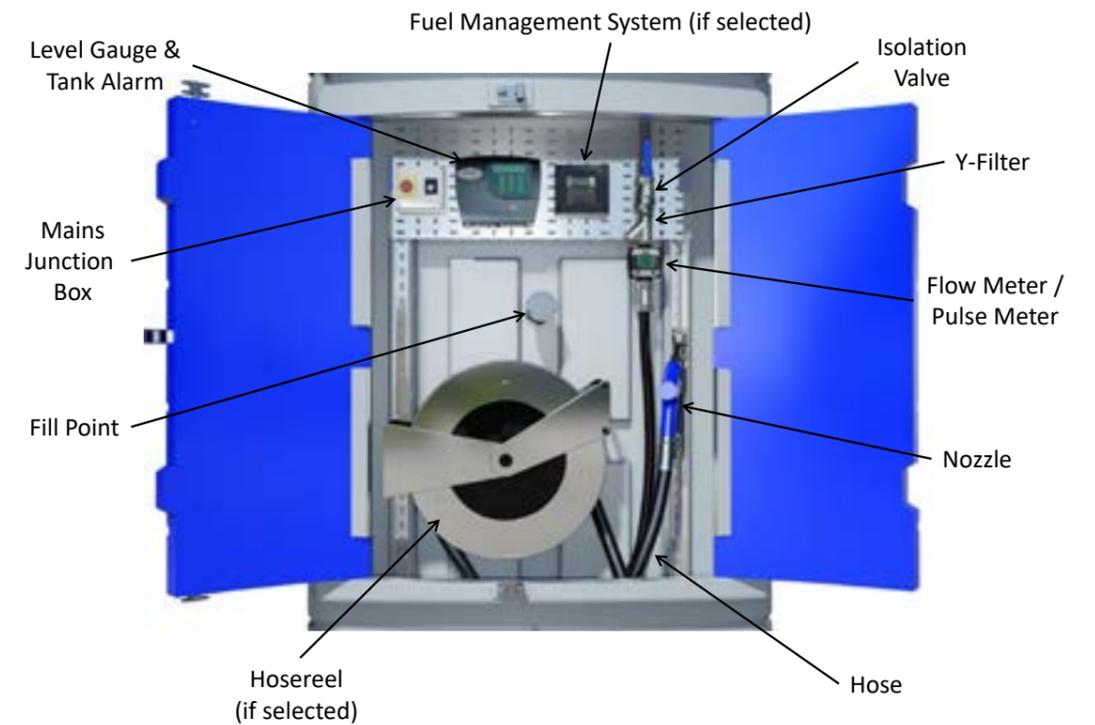
(12V/24V)



(1" top suction)

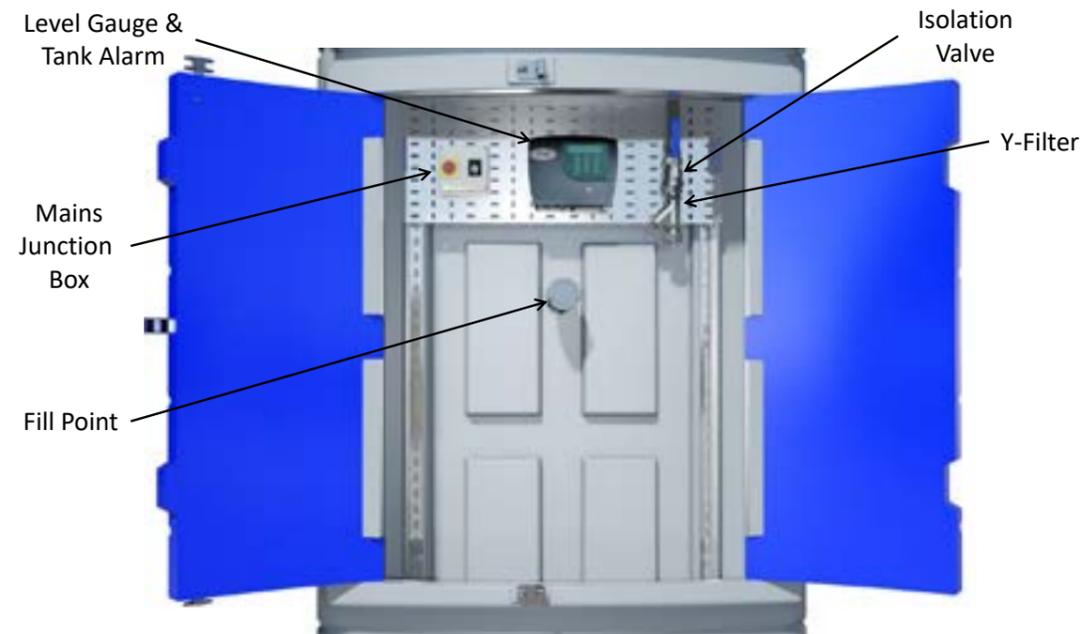


7.3 Summary of main parts 3500 / 6000 / 10000 / 15000 (230V)





### (Terminating in cabinet)



### 7.4 Filling AdBlue® Station

1. Filling should be performed only under constant supervision of an authorised person.
2. This tank can only be filled by a tanker equipped with a 2" female dry break coupling.
3. On 3500 / 6000 / 10000 / 15000 models before filling the tank with AdBlue®, please check the level of the tank and make note of the tank level before filling and ensure the high level alarm indicator functions correctly.
4. Fit tanker delivery hose to 2" dry break fill coupling on tank.
5. Engage tanker pump and begin to fill. Stop filling when desired amount has been dispensed into tank, or when high-level alarm sounds.
6. During the tanker fill always observe tank level gauge throughout the duration of the filling process. The tanker driver must observe the tank being filled at all times during this process.
7. Once complete disconnect delivery hose from tank coupling.

### 7.5 Dispensing AdBlue® into vehicle

1. Reset the flowmeter totalizer to 0.
2. Activate pump using one of the following: Rocker switch / key switch / auto-operational nozzle holster / battery cable clip.
3. Remove nozzle from nozzle holster and insert the nozzle completely into the AdBlue® tank filler neck.
4. Pull trigger on the nozzle to allow AdBlue® to flow into the vehicle AdBlue® tank.
5. At this time the flowmeter counter will start recording the flow, continue refueling until the desired amount is reached or when the vehicle AdBlue® tank is full.
6. When the AdBlue® is full the nozzle will automatically switch off.
7. Release the trigger of the nozzle and replace back into the holster.
8. Deactivate pump with rocker switch / key switch / auto operational nozzle holster / removal of battery cable clips.



## 7.6 EQUIPMENT COMPONENTS

### 1. FMS GAUGE LEVEL (3500 | 6000 | 10000 | 15000)



The Fuel Level Monitoring System is a 240v combined digital tank level indicator and bund and high-level alarm that is designed to provide both visual and audible alarms whenever a predetermined level in a storage tank is reached. The FMS gives a content readout in both litres and a percentage.

#### A. FULL ALARM

Activation of this alarm indicates that the tank is full. This alarm is shown through visual LED's and audible siren. Note: This audible and visual alarm will remain triggered for a short period of time after it sounds. The audible can be muted using the mute button on the keypad. THE PUMP WILL CONTINUE TO DISPENSE IN THIS ALARM MODE.

#### B. HIGH LEVEL ALARM

Activation of this alarm indicates the tank has reached a high capacity and close attention must be paid to the diesel inside the tank. This alarm is shown through visual LED's and audible siren. Note: This audible and visual alarm will remain triggered for a short period of time after it sounds. The audible can be muted using the mute button on the keypad. THE PUMP WILL CONTINUE TO DISPENSE IN THIS ALARM MODE.

#### C. LOW LEVEL ALARM

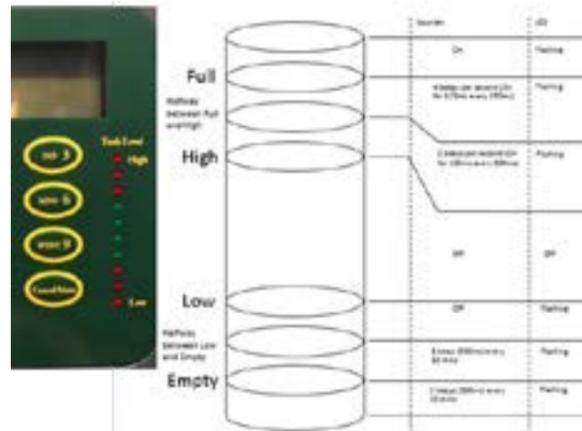
Activation of this alarm indicates the tank has reached a low level. This alarm is shown through visual LED's and audible siren. Note: This audible and visual alarm will remain triggered for a short period of time after it sounds. The audible can be muted using the mute button on the keypad. THE PUMP WILL CONTINUE TO DISPENSE IN THIS ALARM MODE.

#### D. EMPTY ALARM

Activation of this alarm indicates the tank is empty and needs filling. This alarm is shown through visual LED's and audible siren. Note: This audible and visual alarm will remain triggered for a short period of time after it sounds. The audible can be muted using the mute button on the keypad. THE PUMP WILL CONTINUE TO DISPENSE IN THIS ALARM MODE.

#### E. BUND ALARM

Activation of this alarm indicates that there is product in the bund cavity. This alarm is shown through visual LED's and audible siren. Note: This audible and visual alarm will remain triggered constantly until muted or until the product is removed. The audible can be muted using the mute button on the keypad. In the event of this it is advised the bund cavity is checked and drained as soon as practicable.



### F. FMS WIRING DIAGRAM



## 2. NOZZLE & INTEGRATED FLOWMETER (1350 | 2500)

### A. INSTALLATION

The automatic nozzles are supplied ready for use. The nozzle features a SWIVEL hose-end fitting (complete with O-ring) useful for connecting to the supply hose.

TO ENSURE PERFECT OPERATION, THE DEVICE MUST BE USED TO DISPENSE FLUIDS WITH CHARACTERISTICS FALLING WITHIN THE FOLLOWING PARAMETERS:

- Qmin : 15 l/min - Qmax: 45 l/min
- Pmin : 1,5 bar - Pmax: 3,5 bar

#### Attention

During installation, use adequate sealants, being careful no residues remain inside the hose.

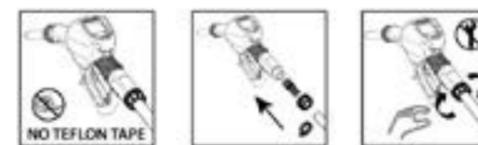
So as not to negatively affect product operation, couple the hose-end fitting with the hose without using tools such as pliers, etc. Assembly will be easier if the swivel hose-end fitting is already fitted on the nozzle.

Make sure the hoses and the suction tank are without threading scale or residues which could damage the nozzle and the accessories

#### Warning

Apply adequate sealants on the male threads of the connections and swivels

Do not use Teflon tape



### B. USE MODALITY

#### B1. MECHANICAL CHARACTERISTICS

The main feature of these nozzles is that they are easy to use.

Two operating modes are available:

##### 1 - Assisted Mode

Dispense by operating the nozzle lever. To interrupt dispensing manually, release the lever.

##### 2 - Automatic Mode

Use the opening lever lock device for automatic dispensing.

To continue dispensing after automatic stop, the lever must be fully released before proceeding to operate it again.

To interrupt dispensing in manual mode, press the lever again, thereby releasing the device, and then release.

#### Attention

DO NOT USE THE NOZZLE OUTSIDE THE PARAMETERS INDICATED ON THE "TECHNICAL SPECIFICATIONS" CHART

Dispensing is automatically interrupted thanks to the shut-off device, which operates when the level of the liquid reaches the end of the spout.

#### B2. ELECTRONIC CHARACTERISTICS

##### Attention

The user can choose between two different operating modes:

##### 1 - Normal Mode

Mode with display of Partial and Total dispensed quantities

##### 2 - Flow rate Mode

Mode with display of Flow Rate, as well as Partial dispensed quantity.

Note: The meter features a non-volatile memory for storing the dispensing data, even in the event of a complete power break for long periods. The measurement electronics and the LCD display are fitted in the top part of the meter which remains isolated from the fluid by the measurement chamber and sealed from the outside by means of a cover.

### C. MISFILLING

#### Premise

Mode with display of Partial and Total dispensed quantities

#### Operation

The "magnet switch" is a magnetic field within the filler necks of the nozzle. This opens the magnet switch in the spout, so it is only possible to dispense from the tank where the magnet adaptor is installed.

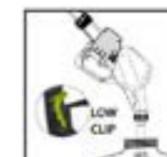
#### Attention

Nozzles equipped with "magnet switch" work only in combination with the "magnet adaptor". The "magnet adaptor" is an option to be bought separately.

### D. PRELIMINARY CHECK

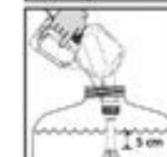
#### Warning

Check the correct operation of the lock device, according to the following procedure:

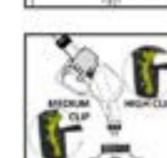


1. Take a graduated receptacle with a capacity of 20 litres (5 gal)

2. Begin dispensing into the receptacle, setting the lever in the minimum flow position, until the receptacle is full.



3. Keeping the lever open, make sure the spout is submerged by about 5 cm (2 inches).



4. The nozzle must stop, with a click of the lever  
5. Repeat the same operations with the lever in medium-flow and maximum-flow position. Check the correct operation of the stop device as described above.



6. If the nozzle stops during dispensing, check and reduce the flow.  
7. If the shut-off device does not begin to operate, check the minimum flow rate of the system or replace the nozzle.

### E. INITIAL START UP

Only start dispensing after making sure that assembly and installation have been correctly performed.

#### Attention

It is good practice to only operate the nozzle lever after making sure the spout has been properly inserted in the mouth of the tank to be filled.

#### Note

When using for the first time and every time the nozzle is used, following the connection of the supply hose, gently operate the lever to enable the air to escape from the circuit, until normal operation is achieved.

#### Attention

Check the correct operation of the automatic stop device once the tank is full.

**THE FAULTY OPERATION OF THIS DEVICE COULD CAUSE THE SPILL OF LIQUIDS THAT ARE HAZARDOUS FOR PEOPLE AND THE ENVIRONMENT.**

### F. WHAT IT LOOKS LIKE

The "LCD" of the METER features two numerical registers and various indications displayed to the user only when the applicable function so requires.

1. Partial register (5 figures with moving comma FROM 0.1 to 99999) indicating the volume dispensed since the reset button was last pressed
2. Indication of battery charge
3. Indication of calibration mode
4. Totals register (6 figures with moving comma FROM 0.1 to 999999), that can indicate two types of Total:

## 7. OPERATION OF THE SYSTEM



## 7. OPERATION OF THE SYSTEM



1. General Total that cannot be reset (TOTAL)
2. Resettable total (Reset TOTAL)
3. Indication of total multiplication factor (x10 / x100)
4. Indication of type of total, (TOTAL / Reset TOTAL);
5. Indication of unit of measurement of Totals:  
L=Litres Gal=Gallons
6. Indication of Flow Rate mode
7. Indication of unit of measurement of Partial:  
Qts=Quarts Pts=Pints  
L=Litres Gal=Gallons

above the word total disappears, and the reset total is replaced by the general total. This situation is called standby and remains stable until the user operates the K24 again.



### G1.1 PARTIAL RESET (NORMAL MODE)

The partial register can be reset by pressing the reset key when the meter is in standby, meaning when the display screen shows the word "TOTAL".

After pressing the reset key, during reset, the display screen first of all shows all the lit-up digits and then all the digits that are not lit up.

At the end of the process, a display page is first of all shown with the reset partial and the reset total and, after a few moments, the reset total is replaced by the non resettable Total.

### G1.2 RESETTING THE RESET TOTAL

The reset total resetting operation can only be performed after resetting the partial register. The reset total can in fact be reset by pressing the reset key at length while the display screen shows reset total as on the following display page:

Schematically, the steps to be taken are:

1. Wait for the display to show normal standby display page (with total only displayed)
2. Press the reset key quickly
3. The meter starts to reset the partial
4. While the display page showing the reset total is displayed  
Press the reset key again for at least 1 second
5. The display screen again shows all the segments of the display followed by all the switched-off segments and finally shows the display page where the reset Reset Total is shown.

### G2. DISPENSING WITH FLOW RATE MODE DISPLAY

It is possible to dispense fluid, displaying at the same time:

1. The dispensed partial
2. The Flow Rate in [Partial Unit / minute] as shown on the following display page:

#### Procedure for entering this mode:

1. Wait for the Remote Display to go to Standby, meaning the display screen shows Total only
2. Quickly press the CAL key.
3. Start dispensing

The flow rate is updated every 0.7 seconds. Consequently, the display could be relatively unstable at lower flow rates. The higher the flow rate, the more stable the displayed value.

#### ATTENTION

The flow rate is measured with reference to the unit of measurement of the Partial. For this reason, in case of the unit of measurement of the Partial and Total being different, as in the example shown below, it should be remembered that the indicated flow rate relates to the unit of measurement of the partial. In the example shown, the flow rate is expressed in Qts/min.

The word "Gal" remaining alongside the flow rate refers to the register of



the Totals (Reset or NON Reset) which are again displayed when exiting from the flow rate reading mode. To return to "Normal" mode, press the CAL key again. If one of the two keys RESET or CAL is accidentally pressed during the count, this will have no effect.

#### ATTENTION

Even though in this mode they are not displayed, both the Reset Total and the General Total (Total) increase. Their value can be checked after dispensing has terminated, returning to "Normal" mode, by quickly pressing CAL.

### G2.1 PARTIAL RESET (FLOW RATE MODE)

To reset the Partial Register, finish dispensing and wait for the Remote Display to show a Flow Rate of 0.0 as indicated in the illustration then quickly press RESET



## H. CALIBRATION

### H1. WHY CALIBRATE?

When working in extreme operating or flow conditions, (close to minimum or maximum acceptable range values), it may be a good idea to calibrate in the field, in the real conditions in which the product has to work.

### H2. DEFINITIONS

#### CALIBRATION FACTOR OR "K-FACTOR":

Multiplication factor applied by the system to the electrical pulses received, to transform these into measured fluid unit.

Factory-set default factor. It is equal to 1,000. This calibration factor ensures utmost precision in the following operating conditions:

Fluid water/urea solution or liquid food products Temperature: 20°C  
Flow rate: 10 - 30 ltr/min

Even after any changes have been made by the user, the factory k factor can be restored by means of a simple procedure

#### USER K FACTOR:

Customized calibration factor, meaning modified y calibration.

### H3. KEY

**LEGEND:** CALIBRATE MEANS PERFORMING ACTIONS ON THE METER KEYS. BELOW IS THE LEGEND OF THE SYMBOLS USED TO DESCRIBE THE ACTIONS TO BE PERFORMED.



### H4. CALIBRATION MODE

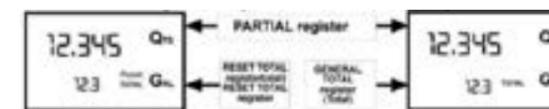
#### Why calibrate?

1. Display the currently used calibration factor:
2. Return to factory calibration (Factory K Factor) after a previous calibration by the user
3. Change the calibration factor using one of the two previously indicated procedures

Two procedures are available for changing the Calibration Factor:

1. In-Field Calibration, performed by means of a dispensing operation
2. Direct Calibration, performed by directly changing the calibration factor

In calibration mode, the partial and total dispensed quantities indicated on the display screen take on different meanings according to the calibration procedure phase.

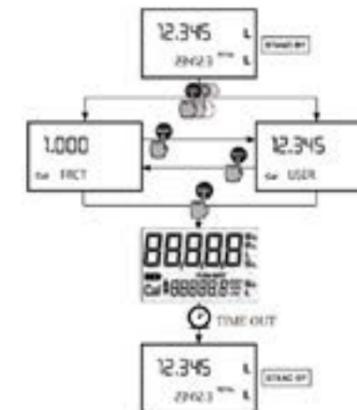


### H4.1 DISPLAY OF CURRENT CALIBRATION FACTOR AND RESTORING FACTORY FACTOR



By pressing the CAL key while the appliance is in Standby, the display page appears showing the current calibration factor used. If no calibration has ever been performed, or the factory setting has been restored after previous calibrations, the following display page will appear: The word "Fact" abbreviation for "factory" shows that the factory calibration factor is being used.

If, on the other hand, calibrations have been made by the user, the display page will appear showing the currently used calibration factor (in our example 0,998). The word "user" indicates a calibration factor set by the user is being used.



The flow chart alongside shows the switchover logic from one display page to another. In this condition, the Reset key permits switching from User factor to Factory factor.

To confirm the choice of calibration factor, quickly press CAL while "User" or "Fact" are displayed. After the restart cycle, the K24 uses the calibration factor that has just been confirmed.

#### ATTENTION

When the Factory Factor is confirmed, the old User factor is deleted from the memory.

### H4.2 IN FIELD CALIBRATION

This procedure calls for the fluid to be dispensed into a graduated sample container in real operating conditions (flow rate, viscosity, etc.) requiring maximum precision.

#### ATTENTION

For correct K24 calibration, it is most important to:

1. When the Factory Factor is confirmed, the old User factor is deleted from the memory
2. Use a precise Sample Container with a capacity of not less than 5 litres, featuring an accurate graduated indicator.
3. Ensure calibration dispensing is done at a constant flow rate equivalent to that of normal use, until the container is full;
4. Not reduce the flow rate to reach the graduated area of the container during the final dispensing stage (the correct method during the final stages of sample container filling consists in making short top-ups at normal operation flow rate);

## 7. OPERATION OF THE SYSTEM



- After dispensing, wait a few minutes to make sure any air bubbles are eliminated from the sample container; only read the Real value at the end of this stage, during which the level in the container could drop.
- Carefully follow the procedure indicated below

### H4.2.1 IN FIELD CALIBRATION PROCEDURE

ACTION	DISPLAY
1 NONE NEXT in Standby	
2 <b>LONG CAL key keying</b> The NEXT enters calibration mode, shows <<CAL>> and displays the calibration factor in use instead of partial. The words "Fact" and "USER" indicate which of the two factors (factory or user) is currently in use. Important: This factor is that which the instrument also uses for field calibration measurement operations.	
3 <b>LONG RESET key keying</b> The NEXT shows "CAL" and the partial at zero. The NEXT is ready to perform in-field calibration.	
4 <b>DISPENSING INTO SAMPLE CONTAINER</b> Without pressing any key, start dispensing into the sample container.  Dispensing can be interrupted and started again at will. Continue dispensing until the level of the fluid in the sample container has reached the graduated area. There is no need to reach a preset quantity. 	
5 <b>SHORT RESET key keying</b> The NEXT is informed that the calibration dispensing operation is finished. Make sure dispensing is correctly finished before performing this operation. To calibrate the NEXT, the value indicated by the partial totaliser (example 9.800) must be forced to the real value marked on the graduated sample container. In the bottom left part of the display an arrow appears (upwards and downwards), that shows the direction (increase or decrease) of the value change displayed when the following operations 6 or 7 are performed.	

ACTION	DISPLAY
6 <b>SHORT RESET key keying</b> The arrow changes direction. The operation can be repeated to alternate the direction of the arrow.	
7 <b>SHORT/LONG CAL key keying</b> The indicated value changes in the direction indicated by the arrow - one unit for every short CAL key keying - continually if the CAL key is kept pressed. The speed increase rises by keeping the key pressed. If the desired value is exceeded, repeat the operations from point (6).	
8 <b>LONG RESET key keying</b> The NEXT is informed that the calibration procedure is finished. <u>Before performing this operation, make sure the INDICATED value is the same as the REAL value.</u>  The NEXT calculates the new USER K FACTOR; this calculation could require a few seconds, depending on the correction to be made <b>ATTENTION:</b> If this operation is performed after action (5), without changing the indicated value, the USER K FACTOR would be the same as the FACTORY K FACTOR, thus it is ignored.	
9 <b>NO OPERATION</b> At the end of the calculation, the new USER K FACTOR is shown for a few seconds, after which the restart cycle is repeated to finally achieve standby condition. <b>IMPORTANT:</b> From now on, the indicated factor will become the calibration factor used by the NEXT and will continue to remain such even after a battery change.	
10 <b>NO OPERATION</b> The NEXT stores the new work calibration factor and is ready to begin dispensing, using the USER K FACTOR that has just been calculated.	

### H4.3 DIRECT MODIFICATION OF K FACTOR

If normal NEXT operation shows a mean percentage error, this can be corrected by applying to the currently used calibration factor a correction of the same percentage. In this case, the percentage correction of the USER K FACTOR must be calculated by the operator in the following way:

$$\text{New cal. Factor} = \text{Old Cal Factor} * \frac{(100 - E\%)}{100}$$

Example:  
Error percentage found: E% - 0.9 %  
CURRENT calibration factor: 1.000

New USER K FACTOR:  
 $1.000 * [(100 - (-0.9))/100] = 1.000 * [(100 + 0.9)/100] = 1.009$   
If the NEXT indicates less than the real dispensed value (negative error) the new calibration factor must be higher than the old one as shown in the example. The opposite applies if the NEXT shows more than the real dispensed value (positive error).

## 7. OPERATION OF THE SYSTEM



ACTION	DISPLAY
1 NONE METER in Standby	
2 <b>LONG CAL KEY KEYING</b> NEXT enters calibration mode, shows "CAL" and displays the calibration factor being used instead of the partial. The words "Fact" and "User" indicate which of the two factors (factory or user) is currently being used.	
3 <b>LONG RESET KEY KEYING</b> The NEXT shows "CAL" and the zero partial total. NEXT is ready to perform in-field calibration by dispensing - see previous paragraph.	
4 <b>LONG RESET KEY KEYING</b> We now go on to Direct change of the calibration factor: the word "Direct" appears together with the Currently Used calibration factor. In the bottom left part of the display, an arrow appears (upwards or downwards) defining the direction (increase or decrease) of change of the displayed value when subsequent operations 5 or 6 are performed.	
5 <b>SHORT RESET KEY KEYING</b> Changes the direction of the arrow. The operation can be repeated to alternate the direction of the arrow.	
6 <b>SHORT/LONG CAL KEY KEYING</b> The indicated value changes in the direction indicated by the arrow - one unit for every short CAL key keying - continually if the CAL key is kept pressed. The speed increase rises by keeping the key pressed. If the desired value is exceeded, repeat the operations from point (5).	
7 <b>LONG RESET KEY KEYING</b> The NEXT is informed that the calibration procedure is finished. Before performing this operation, make sure the INDICATED value is that required.	
8 <b>NO OPERATION</b> At the end of the calculation, the new USER K FACTOR is shown for a few seconds, after which the restart cycle is repeated to finally achieve standby condition. <b>IMPORTANT:</b> From now on, the indicated factor will become the calibration factor used by the NEXT and will continue to remain such even after a battery change	
9 <b>NO OPERATION</b> The NEXT stores the new work calibration factor and is ready to begin dispensing, using the USER K FACTOR that has just been changed.	

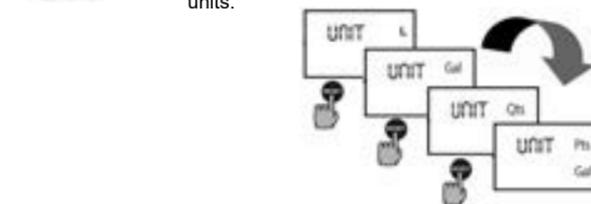
### I. METER CONFIGURATION

The METER feature a menu with which the user can select the main measurement unit, Quarts (Qts), Pints (Pts), Litres (Lit), Gallons (Gal); The combination of the unit of measurement of the Partial register and that of the Totals is predefined according to the following table:

Combination no.	Unit of Measurement Partial Register	Unit of Measurement Totals Register
1	Litres (L)	Litres (L)
2	Gallons (Gal)	Gallons (Gal)
3	Quarts (Qts)	Gallons (Gal)
4	Pints (Pts)	Gallons (Gal)

To choose between the 4 available combinations:

- Wait for the METER to go to Standby
- Then press the CAL and RESET keys together. Keep these pressed until the word "UNIT" appears on the screen together with the unit of measurement set at that time (in this example Litres / Litres )
- Every short press of the RESET key, the various combinations of the units of measurements are scrolled as shown below:
- By pressing the CAL key at length, the new settings will be stored, the METER will pass through the start cycle and will then be ready to dispense in the set units.



### ATTENTION

The Reset Total and Total registers will be automatically changed to the new unit of measurement. NO new calibration is required after changing the Unit of Measurement.

### J. MAINTENANCE

**Battery Replacement** Use 2x1.5 V alkaline batteries size AAA

**WARNING** K24 should be installed in a position allowing the batteries to be replaced without removing it from the system.

K24 features two low-battery alarm levels:

1. When the battery charge falls below the first level on the LCD, the fixed battery symbol appears. In this condition, K24 continues to operate correctly, but the fixed icon warns the user that it is ADVISABLE to change the batteries.

2. If K24 operation continues without changing the batteries, the second battery alarm level will be reached which will prevent operation. In this condition the battery icon starts to flash and is the only one to remain visible on the LCD.



To change the batteries, with reference to the exploded diagram positions, proceed as follows:	UNSCREW THE NUT
	REMOVE THE COVER (1)
	LOOSEN THE SCREW (2)
	REMOVE THE COVER (3) RIGHT SIDE
	CHANGE THE BATTERIES
	ASSEMBLE EVERYTHING BACK ON THE SEAL AROUND THE COVER HOUSING AND TAKE CARE TO PLACE
<b>ATTENTION</b>	<b>DO NOT OVER-TIGHTEN THE SCREW</b>



### 3 FLOWMETER (FITTED TO 3500 | 6000 | 10000 | 15000)



#### A. INTRODUCTION

Not suitable when used in a retail sale of AdBlue®.

#### A1. LCD DISPLAY

The "LCD" of the meter features two numerical Registers and various indications displayed to the user only when the applicable function is selected.

#### A2. USER BUTTONS

The turbine digital meter features two buttons (MENU and RESET) which individually perform two main functions and together, other secondary functions. The main functions performed are:

For the reset key, resetting the partial Register and reset table total (reset total)

For the move key, entering instrument calibration mode.

Used together, the two keys permit entering configuration mode.

#### A3. BATTERY REPLACEMENT

When replacing the battery, please open the cover, remove the plug and replace the battery.

#### B. DAILY USE

##### B1. BUTTON USAGE, CALIBRATION AND MEASUREMENT UNIT CHANGE

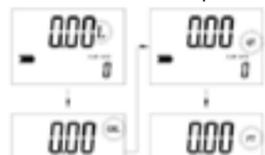
- [Reset the present total](#)
- 1) When the meter is on standby, press the RESET key.
- 2) The display shows all the segments.
- 3) The meter resets the present total already.
- [Show current correction factor and general total](#)

Press MENU and RESET together and hold for two seconds.

Value "1.4000" is the correction factor which can be reset; "1234567" is the general total which cannot be reset.

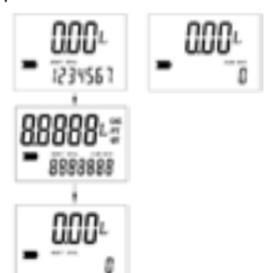
- [Measurement unit change](#)

Press MENU and RESET together and hold for five seconds. Zone 7 on the display is the current unit. Press RESET to choose a different measurement unit and then press MENU to confirm.



##### B2. RESET THE RESETTABLE TOTAL (SEE FIG. 5)

When the meter is on standby, press the RESET key for 2 seconds to reset the present total first.



The K24 will display the same Reset Total, the same Total and the same Partial indicated before the batteries were changed. After changing the batteries, the meter does not need calibrating again.

#### CLEANING

Only one operation is necessary to clean the K24.

After removing K24 from the plant where it was built in, any residual elements can be removed by washing or mechanically-handling.

If this operation does not restore a smooth rotation of the turbine, it will have to be replaced.

#### ATTENTION

**Do not discard the old batteries in the environment. Refer to local disposal regulations.**

**Do not use compressed air onto the turbine in order to avoid its damage because of an excessive rotation.**

**PERIODICALLY CHECK THE CORRECT OPERATION OF THE AUTOMATIC STOP DEVICE.**

**IF FITTED, IT IS BEST TO PERIODICALLY CHECK THE FILTER AND CLEAN IT EVERY 1000 LITRES OF TRANSFER.**

**PERIODICALLY CHECK THE TIGHTNESS OF THE CONNECTIONS.**

#### K. MALFUNCTIONS

##### K1. MECHANICAL MALFUNCTIONS

THE POSSIBLE CAUSES OF MALFUNCTION ARE MAINLY ATTRIBUTABLE TO THREE FACTORS:

1. NOZZLE DIRTY IN INNER HOLE OF LIP AT END OF SPOUT
2. OPERATING PRESSURE OF LIQUID TO BE DISPENSED BELOW 0.5 BAR OR ABOVE 3.5 BAR
3. FLOW RATE TOO LOW OR TOO HIGH

**NOTE: CORRECT AND REGULAR MAINTENANCE OF THE NOZZLE AND OF THE SYSTEM TO WHICH IT IS CONNECTED PREVENTS MALFUNCTIONS AND POSSIBLE ACCIDENTAL SPILLS OF HAZARDOUS LIQUIDS.**

**REFER TO 8.4 TROUBLESHOOTING FOR FURTHER ELECTRONIC MALFUNCTIONS.**



### B3. PROCEDURE TO ENTER THE CORRECTION FACTOR DIRECTLY

Carefully follow the procedure indicated below:

FORMULA
Proper correction factor = current correction factor × (actual value/ display value)

Example:

Actual value 20.75

Display value 18.96

Current correction factor 1.000

Proper correction factor  $1.000 \times (20.75/18.96) = 1.000 \times 1.094 = 1.094$

### B4. MODIFY THE CORRECTION FACTOR IN FIELD

Carefully follow the procedure indicated below:

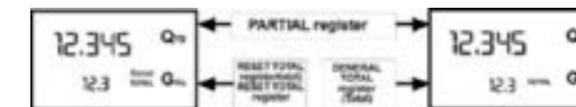
1) Wait for the meter to go to standby.	
2) Reset the resettable total.	
3) Start dispensing into a measuring glass. Stop dispensing when over 5 Litres of volume is reached, read out the actual value. The volume that is displayed on the LCD is the Display Value, not the Actual Value which may be slightly higher. For example, in the figure on the right, the Display Value is 18.96 while the Actual Value is 20.75.	
4) Press the MENU key. Keep it pressed until the first digit '0' flashes.	
Press the RESET key to choose the right digit from 0 to 9. Press the MENU key to go to the next digit so that the Actual Value can be input.	
5) Make sure the correction factor is right and then press the MENU key. Keep it pressed until calibration is finished and the factor is saved. The meter will then return to standby.	

### 4. PULSED OUTPUT FLOWMETER OPERATION



The meter is delivered ready to use. No commissioning operations are required even after long storage periods. The only operations that need to be done for daily use are resetting the Partial and/or Reset Total register. Below are the two typical normal operation displays.

One display page shows the Partial and Reset Total registers. The other shows the Partial and General Total. Switchover from Reset Total to General Total display is automatic and tied to phases and times that are factory set and cannot be changed by the user.



The Partial register positioned in the top part of the display indicates the quantity dispensed since the RESET button was last pressed.

- The Reset Total register, positioned in the lower part of the display, indicates the quantity dispensed since the last Reset Total resetting. The Reset Total cannot be reset until the Partial has been reset, while vice versa, the Partial can always be reset without resetting the Reset Total. The unit of measurement of the two Totals can be the same as the Partial or else different according to the factory or user settings.

- The General Total register (Total) can never be reset by the user. It continues to rise for the entire operating life of the meter. The register of the two totals (Reset Total and Total) share the same area and digits of the display. For this reason, the two totals will never be visible at the same time, but will always be displayed alternately.

The meter is programmed to show one or the other of the two totals at very precise times:

- The General Total (Total) is shown during Meter standby
- The Reset Total is shown:
- At the end of a Partial reset for a certain time (a few seconds)
- During the entire dispensing stage

#### A. USER BUTTONS

Remote display has two buttons (RESET and CAL) which can be used individually or together. If used individually, the RESET button resets the Partial register and that of the Reset Total.

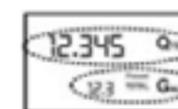
Used together, the two buttons permit entering configuration mode where you can set the desired unit of measurement and the number of pulses by unit of measurement of the partial arriving at the Pulse In inlet.

#### B. DISPENSING IN NORMAL MODE

This is the default dispensing. During this time the count is made. The Partial and Reset Total are displayed at the same time. Should one of the two buttons RESET or CAL be accidentally pressed during counting, this will have no effect.

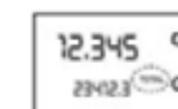
A few seconds after dispensing has ended, on the lower register, the display switches from Reset Total to General Total: the word "Reset" above the word "Total" disappears, and the Reset Total is replaced by the General Total.

This situation is called STANDBY and remains stable until the user operates the meter again.



#### C1. RESETTING THE PARTIAL REGISTER

The Partial Register can be reset by pressing the RESET button when the meter is in Standby, meaning when the display screen shows the word "Total".



## 7. OPERATION OF THE SYSTEM



After pressing the RESET button, during reset, the display screen first shows all the lit-up digits and then all the digits that are not lit up.



At the end of the process, a display page is first shown with the Reset Partial and the Reset Total.



After a few moments, the Reset Total is replaced by the NON resettable.



### C2. RESETTING THE RESET TOTAL

The Reset Total resetting operation can only be performed after resetting the Partial register. The Reset Total can in fact be reset by pressing the RESET button at length while the display screen shows "Reset Total" as on the following display page:

Schematically, the steps to be taken are:



1. Wait for the display to show normal standby display page (with Total only displayed).



2. Press the RESET button quickly.

3. The meter starts to Reset Partial.



4. While the display page showing the Reset Total is displayed, press the RESET button again for at least 1 second.



5. The display screen again shows all the segments of the display

followed by all the switched-off segments. Finally it shows the display page where the reset total is shown.

### C3. DISPENSING WITH THE FLOW RATE MODE DISPLAY

It is possible to dispense fluids, displaying at the same time:

- The dispensed Partial
- The flow rate in [Partial Unit / minute] as shown on the following display page:



Procedure for entering this mode:

1. Wait for the Remote Display to go to Standby, meaning the display screen shows "Total only"
2. Quickly press the CAL button.
3. Start dispensing

The flow rate is updated every 0.7 seconds. Consequently, the display could be relatively unstable at lower flow rates. The higher the flow rate, the more stable the displayed value.

#### WARNING

The flow rate is measured with reference to the unit of measurement of the Partial. For this reason, in case of the unit of measurement of the Partial and Total being different, as in the example shown below, remember that the indicated flow rate relates to the unit of measurement of the partial. In the example shown, the flow rate is expressed in Qts/min.



The word "Gal" remaining alongside the flow rate refers to the register of the Totals (Reset or NON Reset) which are again displayed when exiting from the flow rate reading mode.

To return to "Normal" mode, press the CAL button again. If one of the two buttons RESET or CAL is accidentally pressed during the count, this will have no effect.

#### WARNING

Even though in this mode they are not displayed, both the Reset Total and the General Total (Total) increase. Their value can be checked after dispensing has terminated, by returning to "Normal" mode, and quickly pressing CAL.

### C4. PARTIAL RESET

To reset the Partial Register, finish dispensing and wait for the Remote Display to show a Flow Rate of 0.0 as indicated in the illustration then quickly press RESET

### D1. CONFIGURATION

Use the menu in the Remote Display to configure the machine in accordance with their requirements. The configuration menu consists of two submenus:

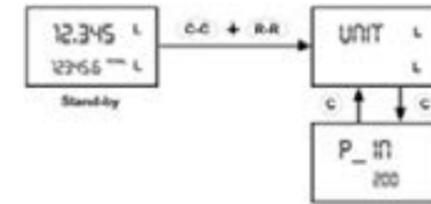
1. Configuration menu for the main unit of measurement
2. Configuration menu for the number of impulses per unit of measurement that the machine can receive on the Pulse-In inlet.

## 7. OPERATION OF THE SYSTEM



To enter the configuration menu, proceed as follows:

1. Wait for the Remote Display to go on Stand-by;
2. Press the CAL and RESET buttons at the same time and hold them down until the word "Unit" and the previously-set unit of measurement appear on the display (Litre/Litre in this example);



3. To move between submenus press the CAL button once quickly.

### D2. CONFIGURATION OF THE UNITS OF MEASUREMENT

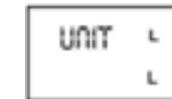
The configuration menu for the units of measurement allows the user to select the partial unit of measurement between four available units: Quarts (Qt), Pints (Pt), Litres (L) and Gallons (Gal).

The combination between the Partial register and the Total register units is preset according to the following table:

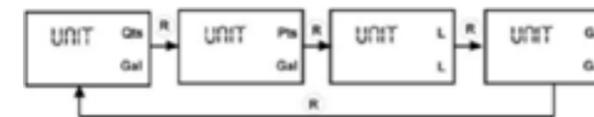
Combination Number	Unit of Measurement Partial Register	Unit of Measurement Totals Register
1	Litre (L)	Litre (L)
2	Gallon (Gal)	Gallon (Gal)
3	Quart (Qt)	Gallon (Gal)
4	Pint (Pt)	Gallon (Gal)

#### WARNING

The partial unit of measurement of the Universal Remote Display Pulse In must be the same as that of the Universal Remote Display Pulse Out to which it is connected.



Enter the configuration submenu as shown previously. Each time the RESET button is pressed quickly, the various units of measurement will appear as shown:

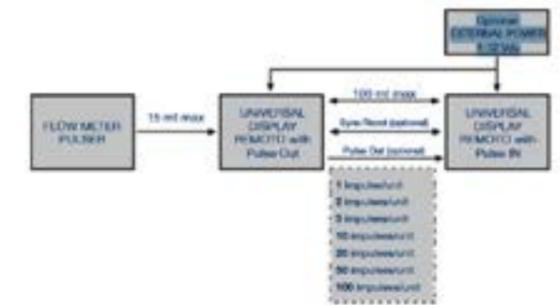


If you want to exit the configuration menu, press and hold down the CAL button. The new settings will be saved, the Remote Display will start up and be ready for measurement. However, if you want to move to the next submenu, press the CAL button quickly. The new settings will still be saved. If no operation is carried out for a certain period of time, the Remote Display will start up and be ready for measurement, but any configuration modifications that had been made will not be saved.

### E. PULSER INPUT (PULSE IN)

The REMOTE DISPLAY may be used with most of the Pulsar flowmeters

and, as an optional, it can have the Pulse OUT outlet to transmit impulses to a display repeater known as the "Pulse IN Remote Display".



For the "Remote Display Pulse In" to show the correct quantity of fluid, it must be configured with an "impulse weight" that is consistent with what is being received from the Universal Remote Display Pulse in. To do this, the Remote Display must be configured in accordance with impulse numbers by partial unit of measurement issued by the Universal Remote Display with Pulse Out.

Enter the configuration menu as shown previously. Press the CAL button to go to the Pulsar inlet configuration submenu: the script "P\_in" and the previously set number of impulses by unit of measurement will appear on the display.

"10" on the display indicates that 10 impulses by partial unit of measurement must enter on the inlet.

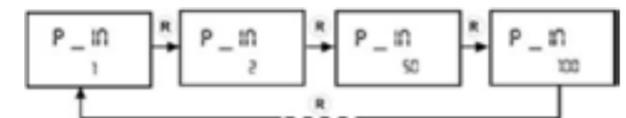


Press the RESET button quickly to scroll through all the available flowmeter models.

The number that appears on the display immediately matches the model as shown in the table below:

Value on Display	Impulse number
1	1 impulse/partial unit of measurement
2	2 impulses/partial unit of measurement
5	5 impulses/partial unit of measurement
10	10 impulses/partial unit of measurement
20	20 impulses/partial unit of measurement
50	50 impulses/partial unit of measurement
100	100 impulses/partial unit of measurement

Press RESET quickly to scroll through all the possible Pulse-Ins:



Select the appropriate flowmeter model. If you want to exit the configuration menu, press and hold down the CAL button. The new settings will be saved, the Remote Display will start up and be ready for measurement. However, if you want to move to the next submenu, press the CAL button quickly. The new settings will still be saved.

If no operation is carried out for a certain period of time, the Remote Display will start up and be ready for measurement, but any configuration modifications that had been made will not be saved.



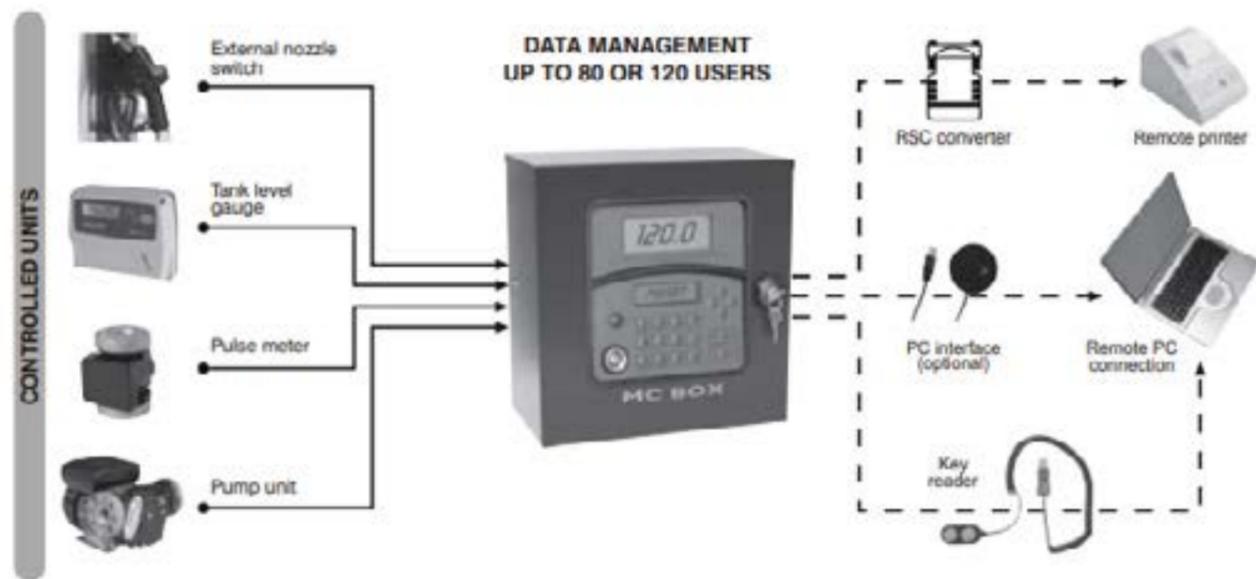
4. MC BOX FUEL MANAGEMENT OPTION

MC BOX Electronic Panels are designed for the private distribution of fuel (or other liquids).

All of the models in the series are characterised by the same form for which the MC BOX is known: a solid metal structure, high-accuracy measurements in the dispensed product and PC software that is designed for simplicity.

This electronic panel allows you to control and monitor private use fuel consumption via a fuel dispenser with pump and flow meter.

The MC system consists of a multi-user panel, dedicated software and the option to connect to a PC.



The MC BOX System has the ability to:

- Switch the pump on;
- Recognise authorised users;
- Preset the dispense quantity;
- Manage the pulse meter;
- Manage an external level switch that turns off the pump in the event of minimum flow level;
- Operate an external nozzle switch;
- Connect directly to a PC;
- Connect to an external printer

The panel is easy to install and is adequately protected. The wiring connections can be easily accessed. The group can also be supplied with a meter, to be installed together with the pump.

Specifications

Panel with dual display, keyboard and i-button reader. The electric box can be opened, allowing easy access to the wiring. Maximum power supply: 6.5 amps.

Optional

- PC Software with dedicated RS converter or i-button reader to export data.
- I-button keys for users.
- High-accuracy oval gear flow meters.

Performance

- 80 or 120-user capacity (depending on model), managed via password or i-button key.
- Total consumption calculation for defined periods for each user.
- Local memory that can store data until the last 255 dispenses.
- Vehicle identification and mileage tracking option.
- Dispensing date and time control.
- Dedicated software that allows you to print dispense data for each user.
- Ability to manage up to 16 control panels with one single software.
- Key reader with USB plug for exporting data.

- RS converter with USB plug for direct connection to the PC via cable (up to 1000 m)

MC Box Installation

General

The MC BOX can be installed outdoors. Nevertheless, it is advisable to locate it under the shelter of a roof to ensure the dispenser's longevity and provide greater comfort during refueling in the event of bad weather. The installation of the dispenser must be carried out by skilled personnel and performed according to the instructions provided in this chapter.

Electrical connections

The power connections must be workmanlike performed by skilled personnel, in strict compliance with the laws applicable in the country of installation and with the instructions on the wiring diagrams in this manual.



The MC BOX is equipped with 3 junction boxes. These can easily be accessed by opening the door to where the screw terminals for the external cable connections are located.

**WARNING**  
Before accessing the electrical parts, be sure that you have disconnected all of the general switches that power off the device.

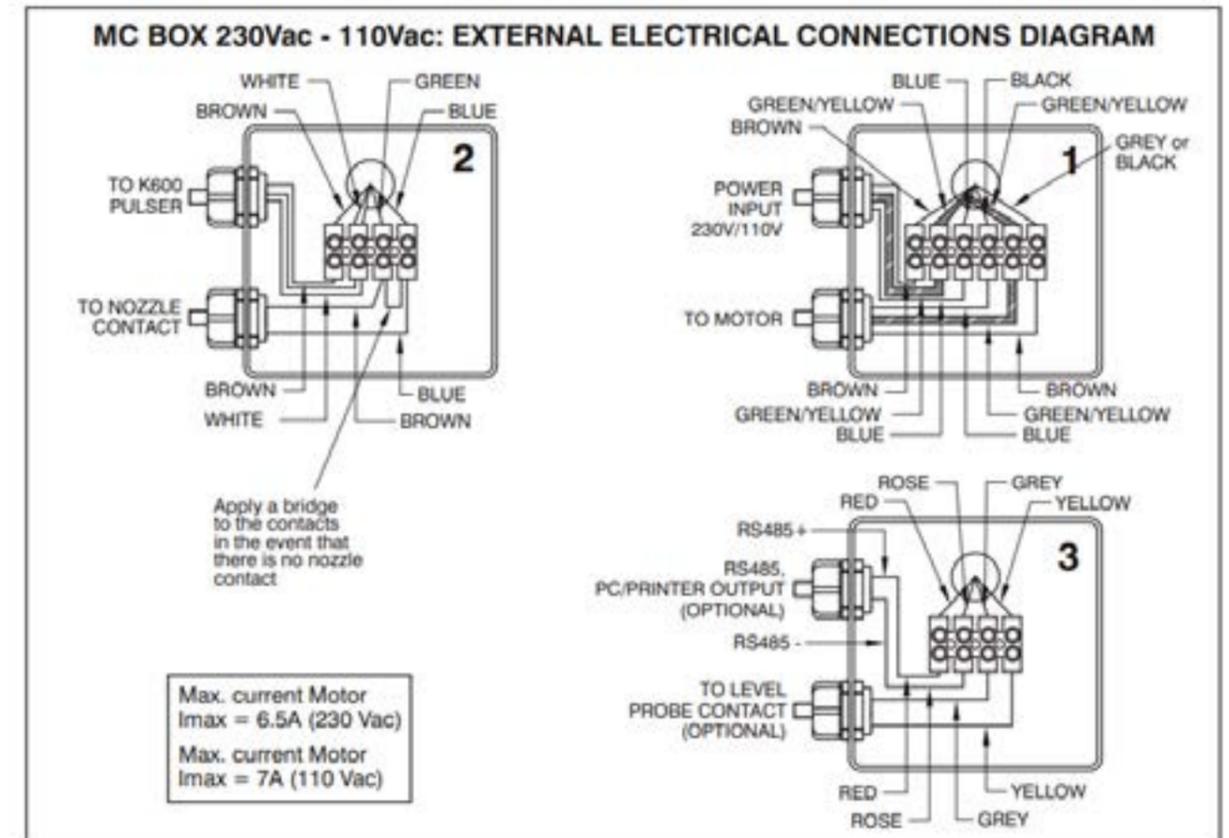
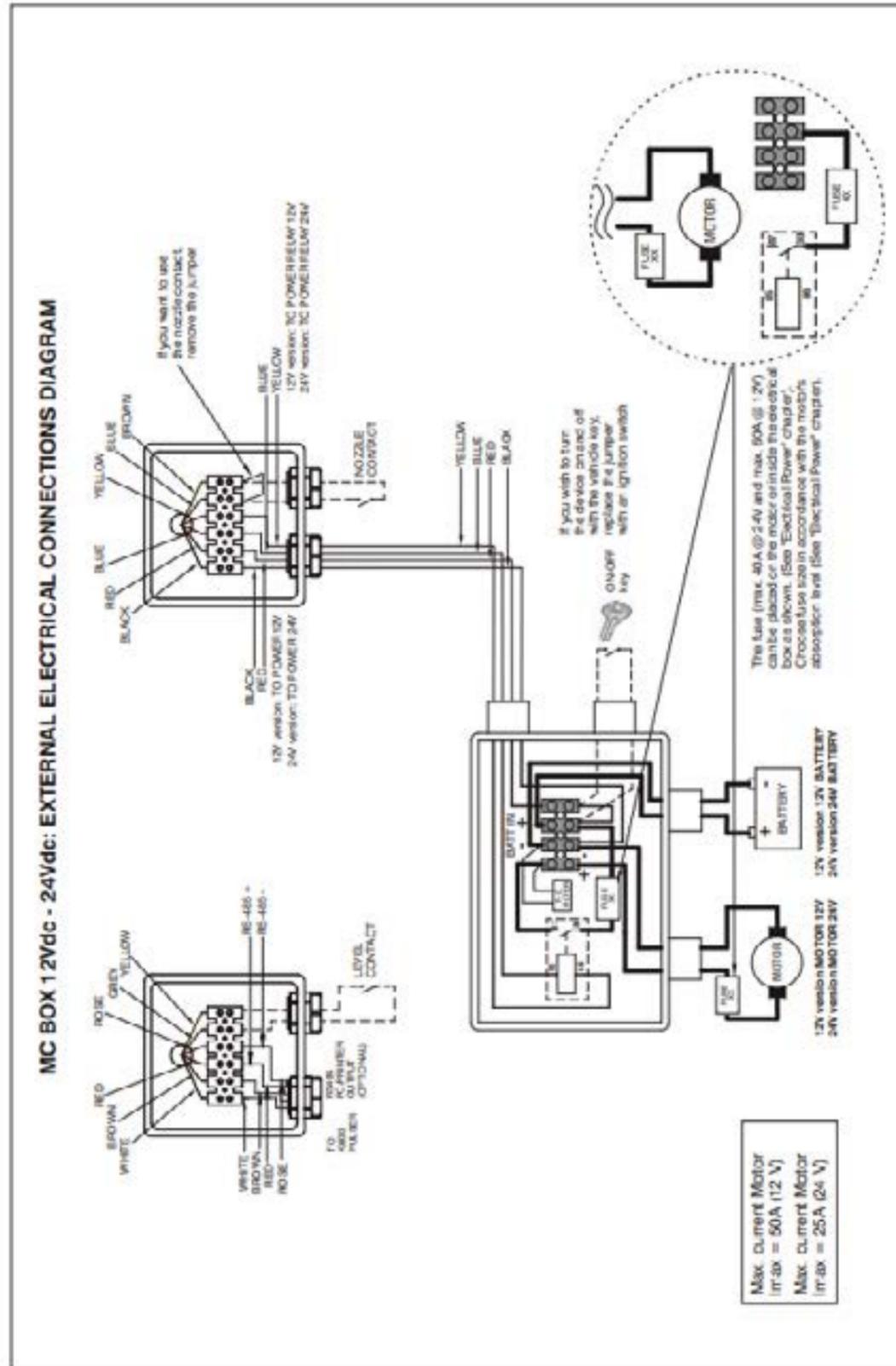
The connections that need to be made vary according to the model (AC or DC):

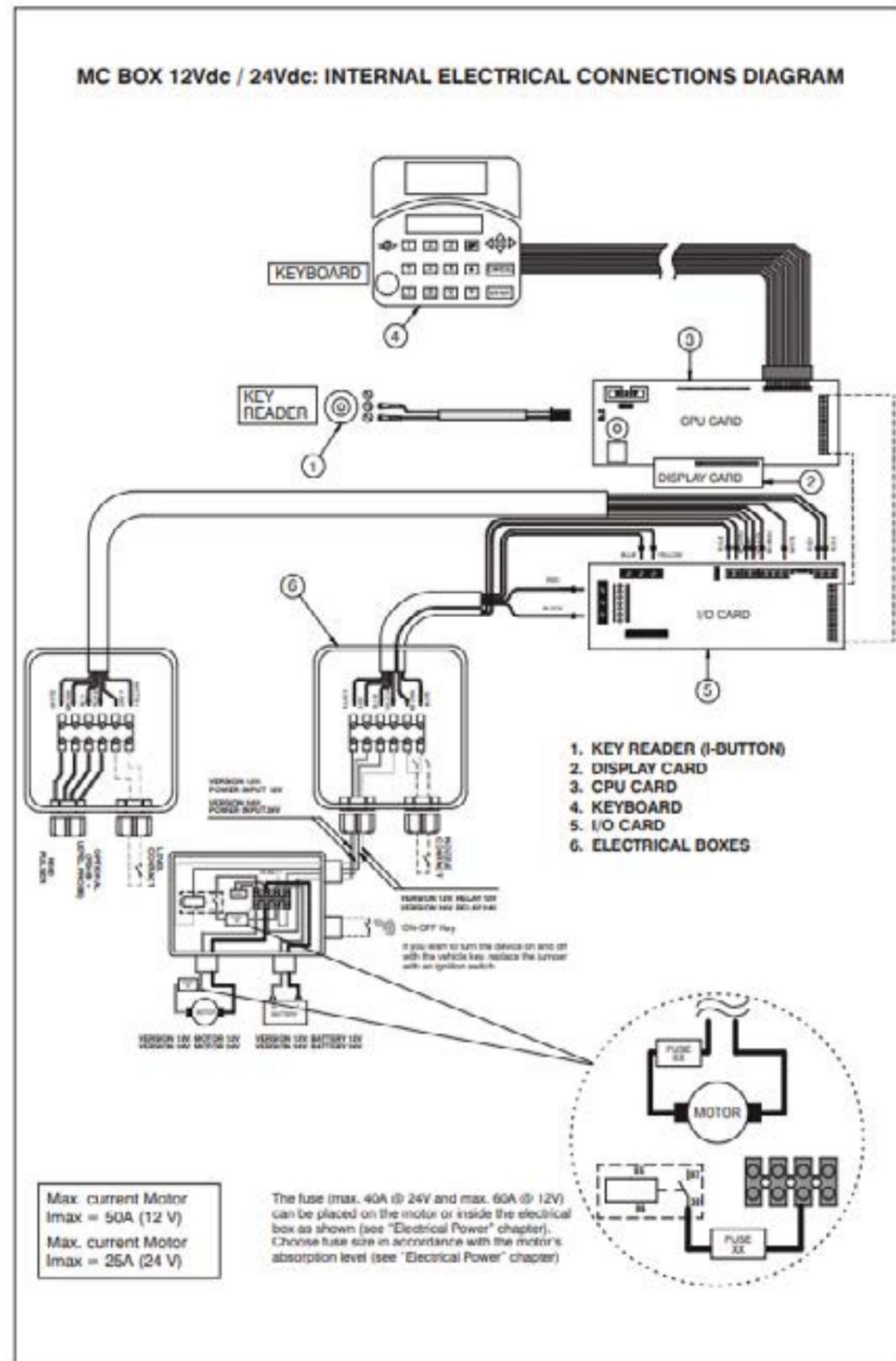
AC Versions:

Inputs	Outputs	Note
AC mains supply	AC motor power the same voltage as the mains-	Voltage: 230Vac or 110Vac, depending on the maximum power of the pluggable motors: • 230Vac version = 1400 W • 110Vac version = 750 W
Nozzle contact: clean contact: Open with nozzle replaced and Closed when nozzle dispensing		
Level contact: clean contact: Open with nozzle in normal conditions and Closed below the minimum flow level		
Pulse meter input: clean contact or Open Collector output signal, with 60 Hz maximum frequency and between 20% and 80% duty cycle		
	The RS 485 data line to the PC (optional)	

DC Versions:

Inputs	Outputs	Note
DC Power Supply	DC motor power is the same as the supply voltage	Voltage: 12Vdc or 24Vac, depending on the maximum power of the pluggable motors: • 12Vdc version = 600 W • 24Vdc version = 600 W
Power input WITH IGNITION ON. Given the DC systems' high power absorption, the motor should be powered while the battery is being recharged		By removing a jumper and inserting the "in ignition" contact in its place, the electronics can be powered only when the vehicle is switched on
Nozzle contact: clean contact: Open with nozzle replaced and Closed when nozzle dispensing		
Level contact: clean contact: Open with nozzle in normal conditions and Closed below the minimum flow level		
Pulse meter input: clean contact or Open Collector output signal, with 60 Hz maximum frequency and between 20% and 80% duty cycle		
	The RS 485 data line to the PC (optional)	





**Commissioning**

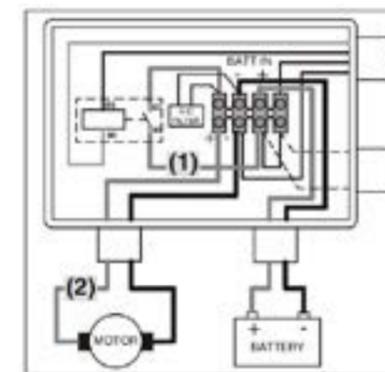
To correctly commission the MC BOX the sequence of operations indicated below must be followed and the MC control system functions must be known.

**Electrical power supply**

Once the power connections have been made, the MC BOX can be energised by means of the master switch by the installer on the upstream line. Switching on of the MC system will be indicated by the lighting up of the two backlit LCDs fitted on the front.

**NOTE:**

In the event of continuous current power supply (DC), a fuse size that is appropriate to the DC motor's absorption level should be introduced to the motor power line.



For example:

- If the connected motor is one that absorbs 10A max then a 12A delay fuse should be inserted.
- If, however, the motor absorbs 50A max, then a 60A delay fuse should be inserted.
- If the fuse is small, it can be fitted along the cable inside the junction box, in position (1) (see illustration)
- If, however, the fuse is very big (e.g. 60A) and cannot physically fit inside the box, then it can be inserted along the motor's power supply cable in position (2) (see illustration)

**Station configuration**

Every MC BOX station can be adapted to the specific requirements of the station manager. To do this the MC control system must be CONFIGURED.

**WARNING**

MC configuration is crucial and must be done by skilled personnel. To perform this operation, the MC manual must be carefully and thoroughly read.

After completing configuration, user PIN CODES can be assigned to the persons charged with using MC BOX, in accordance with the detailed information in the MC manual.

**Disengaging the "MC" system**

All the MC BOX functions are controlled by the MC control system.

The MC system can nevertheless be disengaged for any startup or maintenance activities requiring repeated pump starting.

In these case, it is often convenient to simplify pump startup by not having to enter any code and record any dispensing data.

To do this, a JUMPER has been fitted on the card that permits switching from AUTOMATIC mode (code request to access dispensing) to MANUAL mode (no code request).

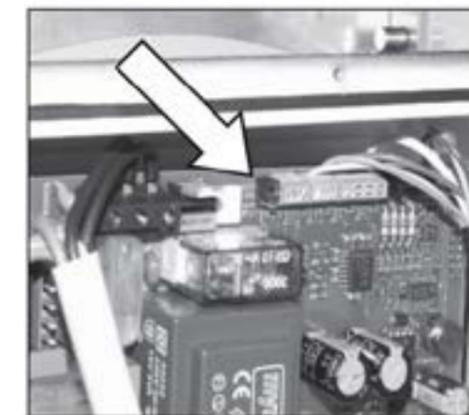
**WARNING**

The jumper is only accessible by opening the front panel and is positioned as shown in the photo. In this operating mode, MC does not record any data relating to performed dispensing operations. **Before accessing this jumper, the voltage must be removed.**



**WARNING**

Before accessing the electrical parts, be sure that you have disconnected all of the general switches that power the device.



In MANUAL mode:

- The MC's LCD may be switched off (only the backlight is clearly visible) or you may continue to see the indication that was present at the time of transition from AUTO to MAN.

- No PIN CODE is required to activate the pump; the pump starts when the dispenser nozzle is removed from its lodging and stops when it is put back (naturally this is in the event that the "nozzle contact" function is used).

- The amount dispensed is not shown in any way.



### Meter calibration

Before using the MC BOX station, check the METER ACCURACY.

For this purpose, proceed as follows:

- Enter a previously enabled USER PIN code;
- Run the fuel into a calibrated container;
- Compare the quantity of dispensed diesel fuel using a calibrated container.

If accuracy is NOT satisfactory, proceed to CALIBRATE THE METER according to the instructions in the specific manual.

#### WARNING

To correctly check accuracy, always keep to the following instructions:

- Use a precision sample container, featuring a graduated scale, with a capacity of at least 20 litres.
- Before making the check, always make sure you have eliminated all the air from the system and then run the fuel until a full and regular flow is achieved.
- Dispense continuously at MC BOX maximum flow rate.
- Stop the flow by quickly closing the nozzle.
- Reach the graduated area of the sample container, avoiding prolonged dispensing at low flow rate, but rather performing short dispensing operations at maximum flow rate.
- Compare the reading provided by the container, with that provided by MC BOX, after waiting for all the froth to disappear

#### WARNING

Differences of up to 1/10 of a litre affecting the dispensing of 20 litres of fluid fall within the guaranteed precision of +/- 0,5%.

### Every day use

Thanks to the MC control system, all the MC BOX models provide access to authorised users only.

MC acknowledges User authorisation by means of two alternative systems:

- The entering of a 4-figure SECRET CODE (PIN CODE)
- The fitting of an electronic key (OPTIONAL)

#### WARNING

All the users to whom a PIN CODE is assigned must be adequately instructed and be at least acquainted with the contents of this chapter.

The configuration of the MC system permits requiring the User to enter further optional data (vehicle licence plate, mileage, quantity to be dispensed).

For details, see the MC control system manual.

In the event that these options are not set, MC will recognise an activated PIN CODE and, once the nozzle contact (if applicable) has been closed, the pump is enabled, allowing it to dispense.

The pump will start (if previously enabled) just as soon as the control lever is moved to ON position, while it switches off as soon as the control lever is moved to OFF position.

No further manual operation is required to start or stop the pump.

#### WARNING

Such enabling does not result in immediate pump startup. The pump is in fact controlled under a switch (positioned in the nozzle seat) operated by the user.

### Fuel dispensing

#### WARNING

Fuel must **ONLY** be dispensed under the careful control of the user.

In the case of the simplest configuration (no optional data required), the fuel dispensing procedure is the following:



- Insert PIN CODE (or apply the electronic key)

If the MC recognises the activated PIN (or key), a "GOOD MORNING MANAGER /USER" message is displayed and the pump enabled.



## 8. Maintenance of the TUFFA TANKS

Keep this manual stored in a place of use so it can be obtained for future reference. All persons who install, commission, maintain, and operate the system must be deemed competent by their employers and have the adequate knowledge and training required to carry out any required tasks which are recommended by this manual, it is recommended that any persons carrying out work on the system have fully read and understood the instructions set out by this manual.

It is advised that no changes nor conversions with potential impact on safety may be performed on this system, any spare parts which are used must comply with the technical requirements which are defined in this manual or directly by the manufacturer.

### ATTENTION

Please make sure prior to any maintenance work that power supply is turned OFF and that there is not an inadvertent chance to reconnect the system to power supply.

### WARNING

System warranty will become void if any repairs are made by technicians not authorised by the manufacturer, the same applies to works with hazardous or potentially hazardous equipment.

### ATTENTION

Do not use jet cleaners to clean the system. You can clean the system with water and household cleaners. Do not use an excessive amount of water when cleaning near any electrical items as this can cause a short circuit to occur potentially permanently damaging the equipment.

### 8.1 System maintenance tasks

Activity	Frequency of Task
Keep Equipment in good working order by returning to its original position	After every use
Visually inspect operation of gauge equipment	Weekly
Visually inspect exterior condition of tank	Monthly
Visually inspect condition of delivery hose	Monthly
Physically check bund alarm by activating the float switch in bund cavity (audible alarm)	3 Months
Check electrical cables and cable connection points	3 Months
Visually inspect and if required maintain the tank id plate and warning labels	3 Months
Physically check fixings and bracket stability	6 Months
Visually inspect inner tank and bund cavity	6 Months



8.2 System maintenance tasks

Inspection by Competent Person

Inspections should be undertaken by a competent person that is receiving a delivery of product on every fill prior to and whilst filling.

This inspection should include:

- The fill point arrangement for soundness and leaks
- Any outlet valves should be checked for leaks and operation (open and close successfully)
- The testing of contents gauge, any high level / overfill alarm and bund alarm.
- If vents can be seen that they are clear and unblocked and free of debris.
- A visual inspection around the tank with emphasis on the base of the tank. The inspection for plastic tanks should include any deformation of the surface of the tank i.e. excessive bulging, change in colour due to chemical attack, crazing or stress fractures. The inspection of steel tanks should include looking for evidence of rust and heavy corrosion, damp patches on seams & seam fractures.
- Bund to be visually inspected for soundness and integrity, water, spilt product, or other debris.

8.3 Internal examination and cleaning

Internal examinations should be undertaken by a competent person at appropriate intervals, as determined by the product used, and its cleanliness i.e. solids or water falling out of suspension. Entry into confined spaces should be carefully planned and supervised and should be subject to a strict procedures dependent on the substance stored, and in accordance with HSE requirements.



8.4 Troubleshooting

Symptom	Possible Causes	Solutions
No power	1. Local distribution board fuse	1. Check local distribution board RCD
	2. Power cable damaged	2. Check condition of power cables
	3. Power cable connection broken	3. Check power cable connections
	4. System control panel circuit breakers	4. Open system control panel and check circuit breakers
	5. System control panel connections loose	5. Check cable connections inside of system control panel
	6. Low battery / poor battery clip connection	6. Check battery level / check clip connection
Pump not operating	1. Potential air lock in pipeline caused by tank fill after running dry	1. Remove nozzle allowing air to pass through pipeline
	2. No AdBlue® in the system	2. Request AdBlue® delivery
	3. Pump circuit breaker in control panel tripped	3. Engage pump circuit breaker or replace if necessary
	4. Pump relay fuse in system control panel blown	4. Replace relay / fuse
	5. Pump failure	5. Replace pump
	6. No power to system	6. Check power supply
Slow flow rate	1. Blockage in the system	1. Clean Y filter
Auto nozzle not operating	1. Spring mechanism inside nozzle valve failed	1. Replace nozzle
	2. Trigger plunger failed	2. Replace nozzle
Nozzle holster not switching pump correctly (auto operation nozzle holster versions only)	1. Micro switch failure	1. Replace micro switch
	2. Micro switch lever not contacting correctly	2. Adjust position of micro switch or switch lever
Level gauge does not show reading	1. Power failure to gauge	1. Check power supply and cable connections
	2. Sensor cable connection loose	2. Check sensor cable connections inside gauge unit
	3. Sensor failure	3. Refer to manufacturer
	4. Gauge unit failure	4. Refer to manufacturer
Level gauge shows incorrect reading	1. Pressure sensor not positioned at base of tank	1. Lower pressure sensor down until it touches base of tank
	2. Incorrect gauge parameters	2. Refer to manufacturer to alter gauge parameters
	3. Sensor failure	3. Refer to manufacturer
	4. Gauge unit failure	4. Refer to manufacturer
Bund alarm not working	1. Bund float switch not positioned correctly	1. Alter position of float switch to hang approximately 1" off bund floor
	2. Bund float not able to move freely	2. Check float switch for blockage or replace if necessary
	3. Damage to bund cable	3. Refer to manufacturer
	4. Float switch cable	4. Refer to manufacturer



8.4 Troubleshooting		
Symptom	Possible causes	solutions
AdBlue® in bund cavity	1. Inner tank overfill	1. AdBlue® must be removed from the cavity as soon as possible
	2. Pipework leaking in bund cavity	2. See point 1
	3. Inner tank leaking	3. See point 1
Pipework leaking	1. Threaded connection loose	1. Connection must be tightened
	2. Thread sealant degraded	2. Thread sealant must be replaced
	3. O-ring or seal joint perished	3. O-ring or seal must be replaced
	4. Swaged hose ends leaking	4. Hose assembly needs replacing; refer to manufacturer
	5. Rubber hose perished	5. See point 4
Hose reel not operating correctly	1. Internal reel spring has come loose	1. Refer to manufacturer
	2. Spring failure	2. Refer to point 1
Flowmeter display not working (3500+)	1. Battery in display has no power	1. Replace battery
Flowmeter displays incorrect readings (3500+)	1. Blockage to meter turbine	1. Undo meter joints and remove blockage
	2. Flowmeter calibration is incorrect	2. Refer to flowmeter instructions in operation section
	3. Display failure	3. Replace pulse meter display or flowmeter
Inner tank has lifted up and ruptured bund lid	1. AdBlue inside bund is causing inner tank to float	1. Refer to manufacturer
Tank exterior damaged	1. Impact from external force	1. If the damage is significant refer to manufacturer for further information
Flip lid does not open easily	1. Gas strut(s) have de-gased and are not operating	1. Gas strut(s) need replacing
LCD no indication (1350/2500 models)	1. Bad battery contact	1. Bad battery contact
Inaccurate meter readings (1350/2500 models)	1. Wrong K FACTOR	1. With reference to paragraph H, check the K FACTOR
	2. The meter works below minimum acceptable flow rate	2. Increase the flow rate until an acceptable flow rate range has been achieved
Reduced or zero flow rate (1350/2500 models)	1. TURBINE blocked	1. Clean the TURBINE
The meter does not count, but the flow rate is correct	1. Incorrect installation of gears after cleaning	1. Repeat the reassembly procedure
	2. Possible electronic card problems	2. Contact your dealer



8.4 Troubleshooting		
Symptom	Possible Causes	Solutions
The MC BOX does not switch on	Power supply has failed due to: <ul style="list-style-type: none"> <li>• The power leads being connected incorrectly</li> <li>• The upstream circuit switch being in the OFF position</li> <li>• The power supply fuse being interrupted</li> <li>• For DC versions: vehicle key in the OFF position (if the "ignition on" power supply option has been adopted)</li> </ul>	<ul style="list-style-type: none"> <li>• Check connections</li> <li>• Ensure disconnect switch is in the ON position</li> <li>• Check fuse</li> <li>• Turn the vehicle key to the ON position</li> </ul>
The MC BOX turns on and the displays light up but no words appear. The MC BOX turns on and the displays light up but the words that appear are irregular and the system does not respond to any commands	AUTO/MAN jumper in the MAN position	Put the jumper to the AUTO position
The system does not recognise the "USER" with PIN CODE or Electronic key	The user has not yet been configured by the system MANAGER	The system MANAGER sets up a New User
	The key has not been linked to the User by the system MANAGER	The system MANAGER links the key to the User
	The keyboard is damaged and does not insert the data properly	Change keyboard (contact technical support)
The MOTOR will NOT START	The electronic key is damaged and is no longer recognised by the system	Change electronic key (contact technical support)
	It has not been connected properly to the set terminals	Check connections
DOES NOT COUNT when dispensing	Action not permitted by nozzle contact	Check how the nozzle contact option has been set (YES/NO) and the status of the relevant jumper
	The Pulser that emits the count signals has not been connected properly	Check connections
DOES NOT COUNT when dispensing	The Pulser that emits the count signals is NOT compatible with the electronics	An incoming electronic signal, namely "clean contact" or "OpenCollector", should be received. If the input signal is an incompatible voltage signal, the electronic board is likely to be damaged, in addition to the malfunction









- caused by alteration or repair by you or by a third party who is not one of our authorised repairers; or
- caused by non-observance of either any applicable statutory requirement or any of the instructions contained in the installation and operating instructions appropriate to your product, and in this respect, we would draw particular attention to the fact that your product must not be used in conditions which are either below -17°C or which are above 35°C without protection from exposure to direct sunlight.

Your product has been used only for the purpose for which it is designed, and that any terms and conditions held with your installer have also been adhered to.

To the maximum extent permitted by UK law:

- the warranty is given in lieu of all other warranties, express or implied by statute or common law, including implied warranties or conditions of satisfactory quality and fitness for a particular purpose, provided that this warranty is in addition to your legal rights in relation to goods that are faulty or not as described; and
- we shall not in any circumstances be liable to you or any other party, whether in contract, tort (including for negligence and breach of statutory duty howsoever arising), misrepresentation (whether innocent or negligent), restitution or otherwise, for any special, indirect or consequential loss or damage.

## 10. Contact

Tuffa UK Limited  
Dovefields Industrial Estate  
Derby Road  
Uttoxeter  
Staffordshire  
ST14 8SW

Tel: +44 (0) 1889 567700  
Web: [www.tuffa.co.uk](http://www.tuffa.co.uk)  
Email: [sales@tuffa.co.uk](mailto:sales@tuffa.co.uk)

## 11. Guarantee registration

To register your tank warranty please visit the link to our website as below. The guarantee card must be completed online within 21 days of the date of the tank delivery to the first purchaser (namely the person or entity buying direct from Tuffa UK Limited).

<https://www.tuffa.co.uk/services/support/guarantee-registration/>



